Trap Screen
Error Message

Type: lg
Load + go

Turbo to 20K
image - 039

Dubner 20–K

User's Guide

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Software Version 2.0

DUBNER

Dubner Computer Systems

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A Grass Valley Group Company

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1. INTRODUCTION

The 20-K is a single-channel, broadcast-quality character generator. It's easy to use, flexible, and fast. The 20-K has been designed with a single goal in mind: to let you create the highest quality graphics in the least amount of time. Its features include:

- Built-in sync generator, encoder, and linear keyer (optional for PAL).
- Anti-aliased fonts for the highest possible resolution.
- 256 colors out of 16 million displayable colors.
- Full-screen text composition.
- Full-screen color background creation.
- A variety of playback effects, including real-time animation.
- Animation creation.
- Playback of animations created with the Dubner CBG/Texta, 30-K, Graphics Factory.
- K-Paint (option).
- Presentation Graphics (option).
- K-series Video Digitizer (option).
- RGB scanner (option).
- Weather system (option).
- Election system (option).

The 20-K is fully compatible with Dubner's family of video products. The 20-K converts messages, fonts and animations into 20-K format from the K-series character generators, CBG/Texta, DPS-1/Turbo, Dubner Still Store and Graphics Factory.

For a quick demonstration of many of our effects, put the distribution disk in the drive, boot from it, press the keystroke **Seq-Play**, then press **Read**, type `DEMO`, press **Enter Enter**.

20183 external supply - Matt Troncone

Pin 4+5
2 ground
between #&9

1.1 How to Use this Manual

The 20-K User's Guide is a reference manual. Read Chapters 1 and 2 before you actually sit down at the keyboard. These chapters give you a basic overview of the 20-K and teach you some general tricks. Then power up the 20-K and turn to Chapter 3. Try every keystroke we describe. It's a good way to become familiar with the wide array of features available to you.

This manual follows a few typesetting conventions to make it easier to read. When we define a new term, we use ***bold italics.*** When we're describing a 20-K keystroke, we use a big fat font: **Enter**. For menus, prompts and other things that appear on the black and white status monitor, we use a typewriter font: `message name`.

1.2 How to Contact Us

If you have any questions about the 20-K or other Dubner products, please don't hesitate to telephone us at 201-845-8900, from 9:00 AM to 5:00 PM Eastern time from Monday through Friday. For our international customers, please contact your local Grass Valley representative. Ask for 20-K operator help.

Before you call, take a minute to jot down your 20-K's program version, date and `SIN` number. You'll find them on the top third of the status monitor display whenever you start the 20-K program. Use a telephone within reach of your 20-K to help us to serve you better.

If you need technical assistance, call the field service department from 8:00 AM to 8:00 PM. Emergency service after hours and on weekends is available by calling a special number. Contact the field service department for further information.

r

1.3 Font Options Policy

Dubner Computer Systems provides at extra cost optional font and software products for the use of our customers. These products are provided for a specific machine which is identified by a Software Identification Number (SIN).

Fonts purchased for a specific machine can be used to create text on that machine. Optional fonts can be loaded on other machines; text can be displayed; characters can be repositioned. New text can not be typed unless the other machine has the font option.

1.4 Advisory to 20-K Users of Program versions previous to 2.0.

We have changed the way we number our Master Fonts. The fonts are the same but the numbers are different. See Section 9.2.

2. ABOUT THE 20-K

The 20-K is an interactive, menu-driven character generator. That's a fancy way of saying that you

- Press a first key to call up a list of possible things to do (a "menu"), then
- Press a second key to pick one of those things, and do it.

Most menus appear on the status monitor without disturbing the "on-air" color video output. On-line help screens are available for further explanation, as you need it.

Not all 20-K functions are prompted by menus. Some are used so often that we've given them their own buttons, like font/color selection and character shifting. You'll learn these in no time.

The status monitor reports the on-going status of the 20-K, e.g. the keying status, the drive selected, the Selector selected, etc. It immediately notes any changes you make. Get used to relying on the status monitor for keeping you informed.

Before you learn about specific functions and keystrokes, though, you should know a couple of general things about the 20-K. We promise this won't take long. And it's important. Honest.

2.1 Pixels and Color Palettes

A 20-K image is made up of many tiny dots of color, called ***pixels***. Pixels are laid out in a rectangular grid pattern, in rows and columns. The total number of pixels across a single row determines the 20-K's ***resolution***. The more pixels, the higher the resolution.

Horizontal rows of pixels are called ***scan lines***. In NTSC, there are 486 visible scan lines. In PAL, there are 576. In the 20-K, there are about 1340 pixels across each scan line.

A single 20-K image contains up to 256 different ***colors***. 20-K colors are different combinations of the three primaries: red, green and blue. Each primary is given a value from 0-255; thus there are 256 possible shades of red, 256 of blue, and 256 of green. That means the 20-K can make a total of 256 x 256 x 256 or over 16 million different colors. Each color can be keyed. But remember, you can only use 256 per image at a time.

2.2 Video Outputs

The 20-K produces two kinds of color video outputs: program out and cursor out, supplied in both RGB and encoded formats (PAL or NTSC).

Program out ("LINE VIDEO OUTPUT") is the actual, live, ready-for-broadcast output of the 20-K. The ***cursor output*** ("CURSOR VIDEO OUT") is the same as the program output, with the addition of a text cursor and safe title area indicators. Normally, the cursor output is routed to monitors near the operator, and the program output routed to the rest of the world.

The 20-K also produces a monochrome dot matrix video output: DOT MATRIX OUT. It is used for prompts, menus, error messages, and other system information. It can also be used for a black and white preset output (preview mode). (See Section 7.1, "Playback Modes.")

The 20-K's built-in ***downstream keyer*** keys 20-K graphics into external video. (This is an option in PAL.) Plug the external video into "background video input," and use the matted output "mixed video output." Or, use the 20-K's "key output" to drive your own external linear keyer. See the 20-K Technical Guide for installation and timing instructions.

NOTE: If characters appear jaggy on your color monitors, you may have to change your keyer configuration. See Section 10.3, "Configuring the 20-K."

2.3 Help When You Need It

Press **Help,** then press any other key, for example, **Text**. The status monitor responds with a summary of how the **Text** key is used. If the word `more` appears in the upper right corner of the screen, there is more help for this key. Press **Next** and **Prev** to browse through the additional pages.

To get help for individual Do commands, type the command name of the command line and press **Help**.

2.4 Menus

Sometimes, when you press a key, a ***menu*** of choices appears on the status monitor. Some menus (**Text, Centr**) require you to press a second key to perform the desired function; your options are listed on the status monitor. Other menus require you to fill in a series of blanks (**Dir C, Font E**). After you've entered the necessary information, press **Enter** to perform the function.

The following keys help you fill in the menu entries:

[↑] [↓]	Move to the next or previous entry.
Home	Move to the beginning of the entry.
Del,Insrt	Delete or insert a character.
Next,Prev	Scroll through the possible responses for filling in this entry. When the entry calls for a font or message name, these buttons scroll through the available messages or fonts. If an entry requires you to choose from a list of possible responses, type the first letter, e.g., **1** for `1-Iomega` in the **Dir S** menu. If two or more responses begin with the same letter, type the second letter, too. When you fill in a `new comment`, **Prev** copies the `old comment` into the new.
Read	In the Record menu, **Read** copies the name of the the message last read into the Record name field.
Enter	After filling in all the necessary items, press **Enter** to execute the function.
Compose	Exit the menu without executing the function.
Quit	Stop the execution of the function after it has started.

The 20-K remembers the last function, e.g. if you **Dir S** then go on to another function, the next time it is only necessary to **Dir Dir.**

3. STARTING THE 20-K

For unpacking, installation, and set up information, please read the 20-K Technical Guide.

TO POWER UP THE 20-K:

- Make sure that the Iomega disk drive(s) is unloaded, with the disk locking lever in the horizontal position.
- Turn the power on by flipping the switch on the rear panel.
- Turn on the monitors.

TO START THE PROGRAM:

- Insert the 20-K Distribution Disk (or any other program disk) into the top drive. Lock it into place.
- Press **Esc B** on the keyboard or press the RESET button (the recessed button on the front of the 20-K mainframe). The system software is loaded into memory, and the 20-K program is initialized. The 20-K is now in Text Compose mode, ready to go.

TO POWER DOWN THE 20-K:

- It is good practice to turn off the 20-K when it isn't in use for an extended period of time (night/weekends).
- Before you power down, always remember to unmount any Iomega disks that are in the drives. Turning off power with a disk mounted and spinning could result in destruction of data.
- Flip the switch on the rear panel.

If you already know how to use and care for Iomega disks, skip ahead to Chapter 4. Otherwise, please read the following.

3.1 Iomega Disks

The 20-K comes standard with one Iomega disk drive. The drive holds a 10 megabyte removable disk cartridge. The 20-K uses Iomega disks to store the program, fonts, and user messages.

The Graphics Factory, the DPS-1/Turbo, the 30-K and the Dubner Still Store use 20 megabyte disks. Some 20-Ks also have 20 megabyte disks. These are compatible but require some attention. You can read a 10 megabyte disk in a 20 megabyte drive, but you cannot write on it. You cannot insert a 20 megabyte disk into a 10 megabyte drive.

You can buy Iomega disks at most computer supply houses, and at some personal computer stores. Radio Shack also carries them. An Iomega disk drive is sometimes referred to as a "Bernoulli Box," and the disks as "Bernoulli disks."

An Iomega disk looks like this:

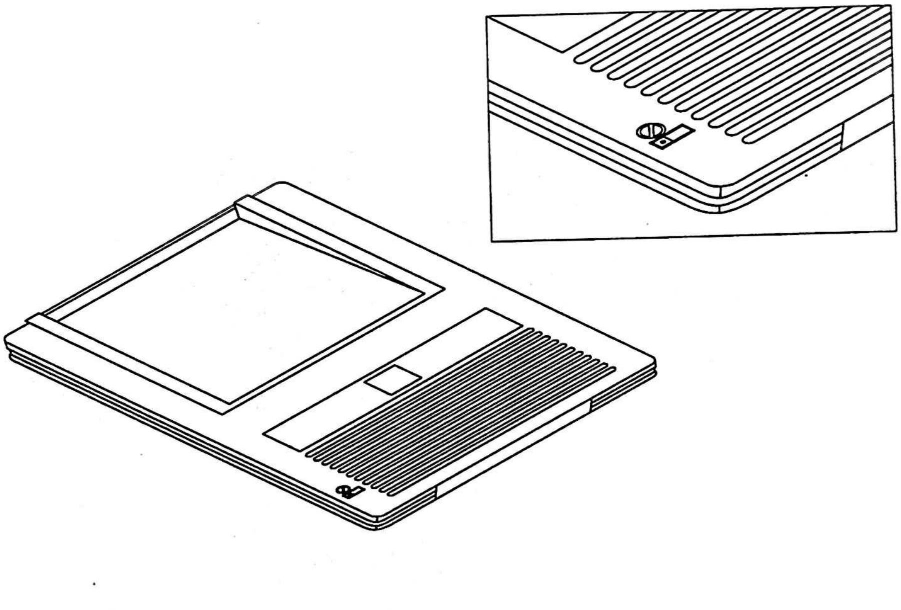


Figure 1: An Iomega Disk

The slider on a corner of the cartridge write-protects the disk. When the slider is directly beneath/above the circle with the diagonal, the cartridge is protected (nothing can be recorded on it). Normally, you *do not* want to write-protect a disk, since you will be recording things on it. But it makes sense to protect, say, your master font disk from inadvertent alterations. Use a pen tip to slide the indicator to the desired position.

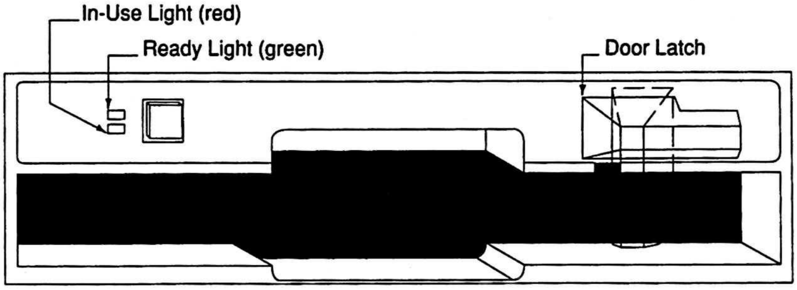


Figure 2: An Iomega Disk Drive

To insert a disk into the drive, hold the disk with the large "10" label up and facing you, and push the disk all the way into the drive. Then flip the door latch one quarter turn clockwise to lock the disk in place. The green READY light on the front of the drive will begin to blink. When the drive reaches operating speed, in about five seconds, the green light stops flashing and stays on. The red light comes on whenever the disk is used by the 20-K software.

The disk cartridge's access panel automatically slides open as you insert the disk. *CAUTION*: Do not open this access panel yourself. The disk medium is extremely sensitive to contamination, and you may cause permanent damage.

To remove the disk, first press the STOP button. The green light blinks as the drive spins down. When the light goes out, the disk has stopped spinning. Twist the door latch one quarter turn counterclockwise, and pull the disk out. *Do not attempt to flip the door latch unless the green light is off and the disk has stopped spinning.*

Before you use a new Iomega disk in the 20-K, format it with **Disk-Util F,** then initialize it with **Disk-Util I.** *Format* sets the data pattern and operative parameters to ready the disk for use. It completely obliterates any information previously stored on the disk. ***Initialize*** writes a blank directory to ready the disk to accept 20-K messages. (As you might expect, a disk cannot be formatted or initialized if it is write-protected.)

To make a backup copy of a disk, press **Disk-Util D** and follow the instructions on the status monitor.

When the program accesses an Iomega disk, the drive may make a series of short, clicking noises. This is perfectly normal. Screeching noises, also known as skating, are not normal—they indicate that the drive head needs to be cleaned. Use the Iomega head cleaning kit supplied with your 20-K. Replacement kits are available wherever you purchase your disks. Iomega recommends that you clean the disk heads after every 50 hours of use.

HELPFUL HINTS. Although Iomega disk cartridges are quite rugged, proper care is necessary to ensure a long and useful lifetime (for the disk, not you). Protect your Iomegas from spills and sharp objects. Don't leave a cartridge in the drive when it is not being used. Don't bring your disks near any magnetic fields (like a monitor!). If you use a single cartridge continually, alternate your disk with a duplicate, daily.

Even with proper care, disks do not last forever. Make frequent backups!!! Occasional disk errors happen.

If disk errors occur often, copy the data to a new disk, then reformat the old one. If that doesn't help, clean the drive. By "often" we mean frequently enough so that you notice them (once is often for some people). Use **Disk Util V** to verify a disk if you encounter errors.

If you accidentally lose your fonts and/or messages because of disk errors, you can sometimes restore them. See **Disk-Util R** in Section 10.1.

4. COMPOSING TEXT DISPLAYS

4.1 Compose Mode

With the 20-K, you create color text displays in much the same way that you type with a word processor. Unlike a word processor, though, the 20-K provides great flexibility for choosing colors and fonts, and positioning characters.

All text composition takes place in Compose Mode. This is the main mode of the 20-K, the "home base" for character generating.

When you start-up or reboot you are in Compose mode. To get to Compose Mode from any other mode, press **Compose.** This does two things:

1. It cancels any functions or effects already in progress, and
2. It brings the 20-K back to Compose Mode.

When you type a text display, you will want to confine your text to the ***safe title area***, the middle eighty percent of the screen. This is because some home receivers do not show the entire picture— the edges get cut off. The 20-K helps you to stay within safe title, although you can always go outside it if you must. The horizontal white lines at the top and bottom of the color monitor show the safe title area.

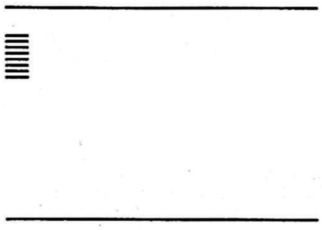


Figure 3: Text Cursor and Safe Title Lines

CAUTION: The keyboard does not know when you reboot. When you reboot,

- the **Cap-Lock** light stays on (or off).
- the typewriter is in lower case mode.

Confusion occurs because the **Cap-Lock** red light remains on (after rebooting) if you were typing in UPPER CASE mode (before rebooting) even though you are typing in lower case mode. Pressing **Cap-Lock** then puts the keyboard in UPPER CASE mode (with no light).

To reset the **Cap-Lock** light, press **Shift** hold it down then **Cap-Lock**. Some operators simply take the light out.

4.2 Selectors

The 20-K allows you to store up to eight font and color combinations, called ***Selectors***. To choose a previously assigned font and color for typing, press **Sel 1** through **Sel 8**. Then press any of the typewriter keys (letters, numbers, punctuation) to type characters.

To see what your Selectors look like, press **Sel-Disp**. On the color monitor you'll see:

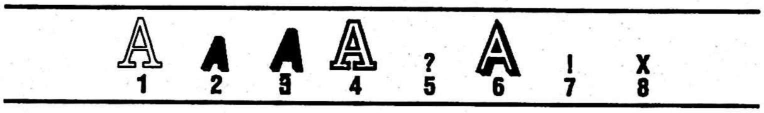


Figure 4: The Selectors

This menu shows you the letter "A" from each font. If a character other than "A" appears, that means:

?	The selector's font is not available.
!	The letter "A" is not present in the selector's font.
X	No font is assigned to that selector.

The Selector highlighted by a cursor is the ***current Selector.*** In the above example, Selector 3 is the current Selector.

We'll tell you how to change the Selectors in Chapter 5. For now, let's assume you've chosen a Selector and you're ready to type some text.

4.3 Text Editing Functions

When you're composing text, the ***text cursor*** tells you "where you are" on the screen. Use the arrow keys [→] [←] [↑] [↓] to move the cursor around the screen. Keys repeat when they're held down for about a second. Try it. This helps you move the cursor around in a hurry.

The following keys move the text cursor around the screen without affecting the text itself. Some keys have alternate functions. Press **Alt**, then press the key.

Home	Move the cursor to the beginning of the top row.
Alt Home	Move the cursor to the beginning of the bottom row.
[→][←][↑][↓]	Move the cursor in the indicated direction. The cursor wraps around the screen.
Alt [→][←][↑][↓]	Move the cursor to the edge of the screen, in the indicated direction.
Shift [→]	Move cursor to the beginning of the next word.
Shift [←]	Move cursor to the beginning of the previous word.
Tab	Advance the cursor to the next tab stop. Use **Text T** to create left, center, and right justified tab stops. If no tab stops are defined, **Tab** moves the cursor to the start of the next word on the current row.

The following keys reposition characters and rows:

Erase Text	***Erase*** the text on the screen. Home the cursor. Set the row size based on the size of the current Selector's font.
Insrt	Toggle between ***insert mode*** and ***typeover mode.*** Normally, newly typed characters are inserted and existing text is shifted to the right. In typeover mode, new characters type on top of the old ones.
Alt **Insrt**	***Insert row.*** Insert a blank row at the cursor position, shifting the following rows down. The cursor is positioned at the start of the blank row. The font size of the current selector determines the height of the inserted row.
New Line	In typeover mode, move the cursor to the start of the next row. In insert mode, break the cursor row in two.
Alt **New Line**	Prompts for a row number. ***Positions the cursor*** at the beginning of that row.
Del	***Delete character.*** Delete the cursor character. To join two rows, move the cursor past the last word of the first row and press **Del**.
Alt Del	***Delete row.*** Delete the cursor row. All rows below move up.
Shift Del	***Delete to end of row.*** Delete all characters from the cursor through the end of the row. Same as **Text D**.
Backspace	Delete the character to the left of the cursor. If the cursor is on the first character of the row, move the cursor row up to the end of the row above.

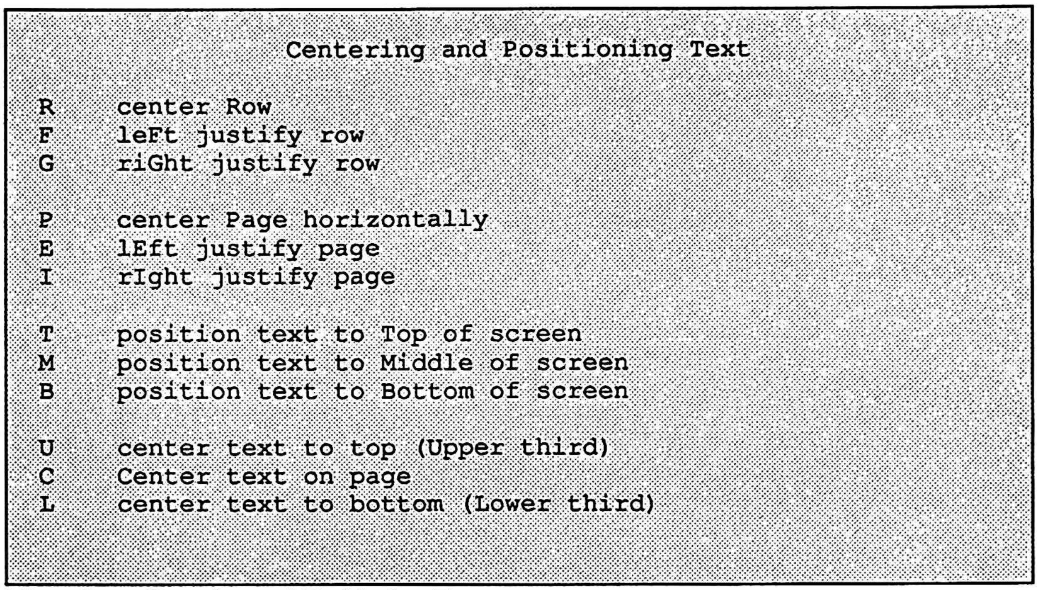
To shift individual characters and rows of text, hold **Shift-Char** or **Shift-Row** down while you press an arrow key. Hold both keys down to shift repeatedly. Use **Kern/Xchg** with an arrow key to swap rows or tighten characters.

Shift-Char + arrow	Move the cursor character, and all characters to the right, one pixel in the direction of the arrow.
Alt **Shift-Char + arrow**	Move just the cursor character one pixel in the direction of the arrow.

Shift-Row + arrow	Move all characters on the cursor row and below one pixel in the direction of the arrow.
Alt Shift-Row + arrow	Move just the characters on the cursor row one pixel in the direction of the arrow.
Kern/Xchg + [↑]	Exchange the cursor row with the row above it.
Kern/Xchg + [↓]	Exchange the cursor row with the row below it.
Kern/Xchg + [→]	Increase character ***kerning*** (spacing between characters) on the cursor row by one pixel. Characters that are more than a space's width apart are not kerned.
Kern/Xchg + [←]	Decrease character kerning on the cursor row by one pixel.
Alt Kern/Xchg + [→]	Increase kerning of all characters on the screen by one pixel.
Alt Kern/Xchg + [←]	Decrease kerning of all characters on the screen by one pixel.
Alt Kern/Xchg + [↑]	Increase the row ***leading*** (spacing between rows) by one scan line. The cursor row remains fixed, and the other rows move away.
Alt Kern/Xchg + [↓]	Decrease the row leading by one scan line. The cursor row remains fixed, and the other rows move closer.

4.4 Centering Text on the Screen

The **Centr** key displays this menu:



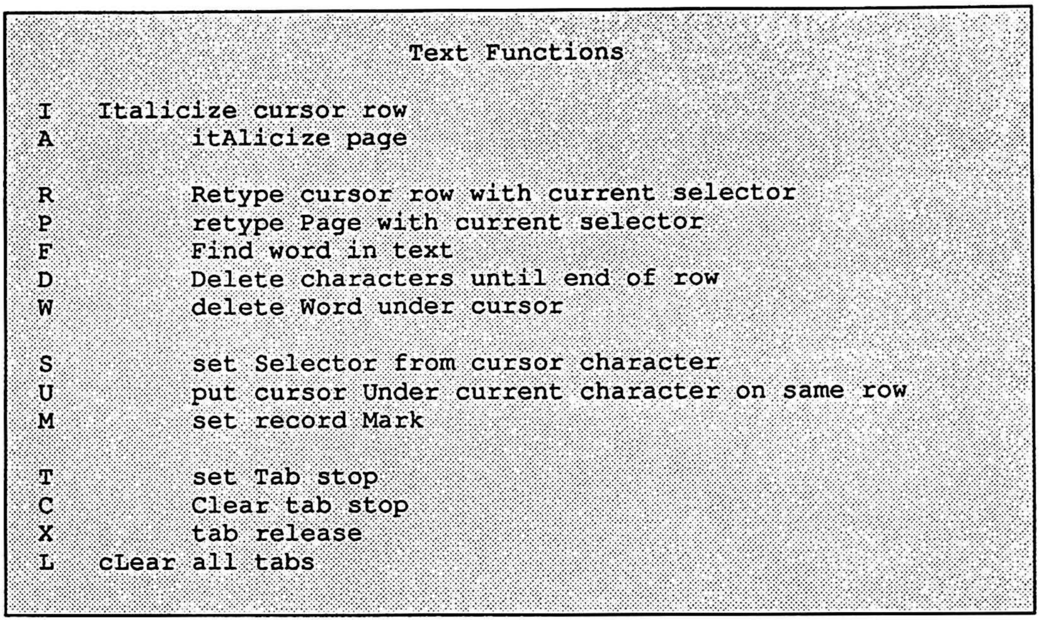
```
                  Centering and Positioning Text

R    center Row
F    leFt justify row
G    riGht justify row

P    center Page horizontally
E    lEft justify page
I    rIght justify page

T    position text to Top of screen
M    position text to Middle of screen
B    position text to Bottom of screen

U    center text to top (Upper third)
C    Center text on page
L    center text to bottom (Lower third)
```

Menu 1: Centering and Positioning Text

These functions are self-explanatory. Try them and see.

4.5 More Text Functions

Text displays this menu:



```
                          Text Functions

 I   Italicize cursor row
 A         itAlicize page

 R         Retype cursor row with current selector
 P         retype Page with current selector
 F         Find word in text
 D         Delete characters until end of row
 W         delete Word under cursor

 S         set Selector from cursor character
 U         put cursor Under current character on same row
 M         set record Mark

 T         set Tab stop
 C         Clear tab stop
 X         tab release
 L   cLear all tabs
```

Menu 2: Text Functions

Here are the details:

Text I	***Italicize*** the cursor character, and all characters to the right of it, so that they lean to the right. Use [←] and [→] to vary the italics amount and direction. *CAUTION*: Italics do not work well with anti-aliased fonts. Use an italic font instead.
Text A	***Italicize all.*** The entire page italicizes to the right. [←] and [→] vary the italics amount and direction.
Text R	***Retype Row.*** Retype characters on the cursor row using the current Selector. Only characters with the same font number and color as the cursor character are retyped.
Text P	***Retype Page.*** Same as **Text R**, for characters anywhere on the page. *HINT*: Experienced operators use **Text R** and **Text P** to rapidly change colors, fonts, and edge types.

Text F	***Find Word.*** Search for a word in on-screen text. The status monitor prompts for the word.
Text D	***Delete to end of row.*** Delete all characters from the cursor through the end of the row. Same as **Shift Del.**
Text W	***Delete word.*** Delete the word under the cursor. The remaining characters on the row move to the left.
Text S **Sel 1 - 8**	***Set Selector*** from the cursor character. The color, font, and edge settings from the cursor character are copied to that Selector. For example,

Text S Sel-2	sets Selector 2 so that it types characters exactly like the cursor character.

To copy just the font, press **Font** before you press a Selector. For example,

Text S Font Sel-3	sets Selector 3 to the same font as the cursor character without changing the colors of the Selector.

To copy just the color, press **Pal** before you press a Selector. For example,

Text S Pal Sel-5	sets Selector 5 to the same colors as the cursor character without changing the font of the Selector.

To copy just the foreground, edge, or drop shadow color, press **F, E,** or **D** before you press a Selector. For example,

Text S E Sel-4	sets Selector 4 so that it types characters with the same edge color as the cursor character.

Text U

Under Row. Move the cursor directly underneath its current position, but keep it in the same text row. Use **Text U** to create displays with a large character spanning two "rows" of text, like this:

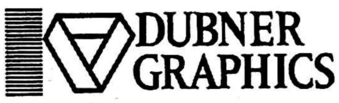


Figure 5: Text U. Under Row

Text M

Record Mark. Place a record mark on the cursor row. If the cursor row already has a record mark, remove it. The record mark is a special character of white vertical lines displayed after the last real character on a row. You can have only one record mark on a page.

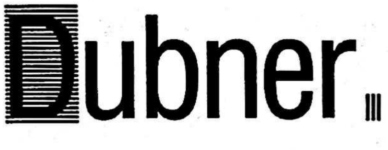


Figure 6: Text M. Record Mark

Normally, when you record a page of text, the entire screen is saved. However, if a record mark is on the screen, only those rows from the cursor row through the record mark row are saved.

When you recall a record mark message, only rows starting with the cursor row are replaced.

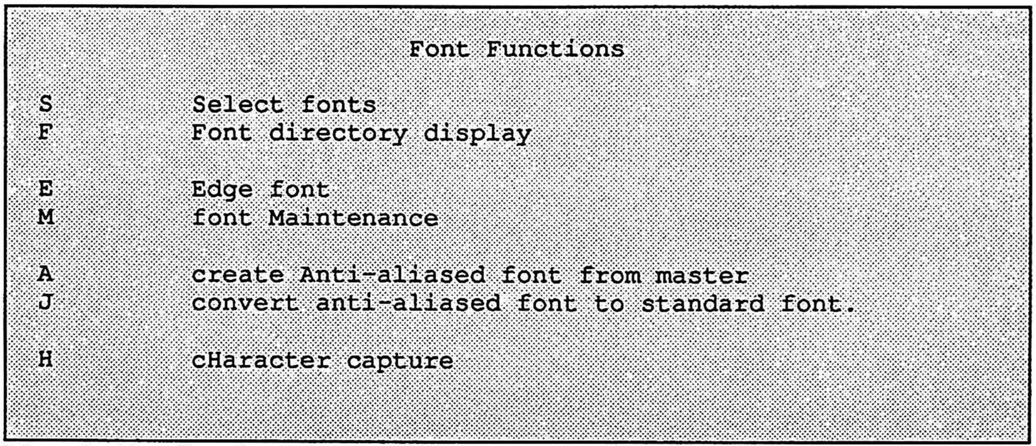
HINT: You can use record marks to control the distance between the rows of a credit roll, by placing a record mark on the last row of each page. Don't forget to return the cursor to the home position when you record each text message.

Text T	***Tab Set.*** Set a tab stop at the cursor position. The status monitor prompts for **L, C,** or **R** to create a left-justified, centered, or right-justified tab stop.
Text C	***Tab Clear.*** Clear the tab stop at the cursor position.
Text X	***Tab release.*** When a display is created using tab stops, characters are forced to their proper tab position. This occasionally causes problems when you change tab settings. **Text X** removes the tab markers from the cursor row.
Text L	***Clear All Tabs.*** When a text message is read in with previously recorded tab stops, **Text L** clears the tab stops.

5. SELECTING FONTS AND COLORS

5.1 Selecting Fonts

Press **Font** to reveal the following menu:



```
                         Font Functions

 S          Select fonts
 F          Font directory display

 E          Edge font
 M          font Maintenance

 A          create Anti-aliased font from master
 J          convert anti-aliased font to standard font.

 H          cHaracter capture
```

Menu 3: Font Functions

In this chapter, we'll explain how to select fonts with **Font S.** We'll explain the other font functions in Chapter 9. You can also select fonts directly from the Font Directory screen. See Chapter 6.

Font S *Font Select.* Enter Font Select mode to change the Selector fonts.

The color monitor looks like this:

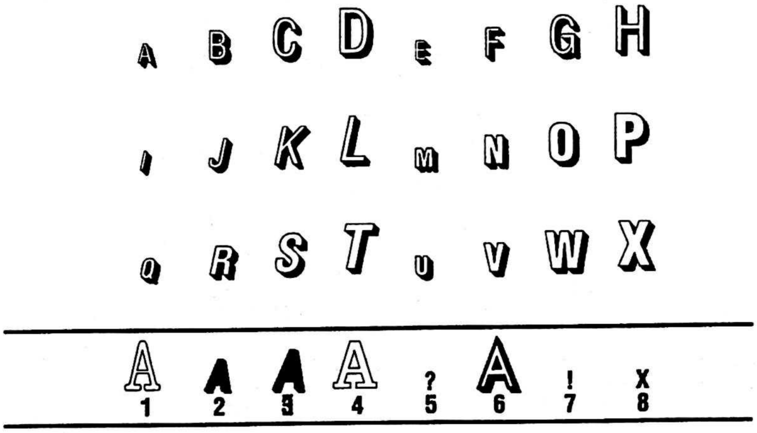


Figure 7: Font Selection Display

The bottom of the screen shows the Selectors. The top of the screen shows up to 24 different fonts, using the letters A - X. You will see the letter "A" from the first font, the letter "B" from the second font, and so on, in the colors of the current Selector. To see more fonts, press **Next** and **Prev.**

Before you can type characters in a font, it must be assigned to a Selector. To assign a font to a Selector, first press the Selector, then press a letter, A - X.

The status monitor lists the number and comment for each displayed font. Fonts preceded by a blank are anti-aliased. For other types of fonts, the following letters may appear:

S	***Standard font.*** These are "jaggy," or non-anti-aliased fonts.
P	***Preset-color fonts.*** Used for logos and other user-created fonts. See Section 9.6, "Create a Custom Font."
M	***Master font.*** Master fonts are used to create other fonts, and cannot be selected.

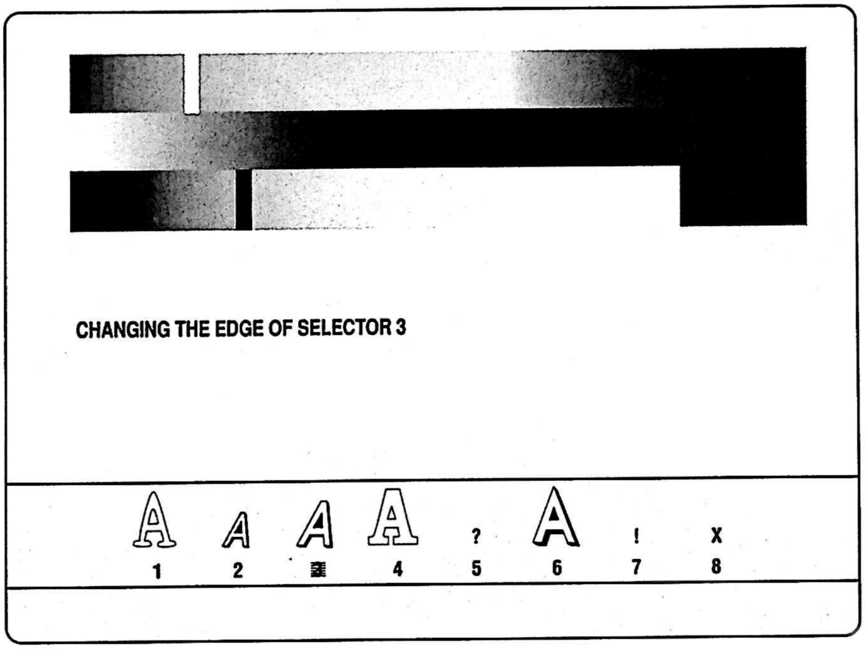
Use the following keys in Font Select mode:

Compose	Return to Compose mode.
Sel 1 - Sel 8	Choose a new Selector. Redisplay the fonts using the new Selector's colors.
A - X	Assign the indicated font to the current Selector. The same font can be assigned to more than one selector.
Next, [↓] or **Enter**	Display the next page of the font display.
Prev or [↑]	Display the previous page of the font display.
Home	Display the first page of the font display.
Alt **Home**	Display the last page of the font display.
[←]	Shift all the displayed characters one position to the left so that one new font is added to the bottom right of the display.
[→]	Shift all the displayed characters one position to the right so that one new font is added to the top left of the display.
Del	Remove the font from the current selector.
Font F	Display the directory of the available fonts on the status monitor.
Dir S	Select a different font disk.

5.2 Palette Mode

Press **Pal** to change the current Selector's colors. Each Selector has three colors you can change: a foreground color, an edge color, and a drop shadow color. Each color can also be turned on and off.

The color palette display looks like this:



CHANGING THE EDGE OF SELECTOR 3

Figure 8: The Color Palette

When you press **Pal,** you're ready to change the foreground color of your current Selector, Selector 3 in this example. To change the other colors, press:

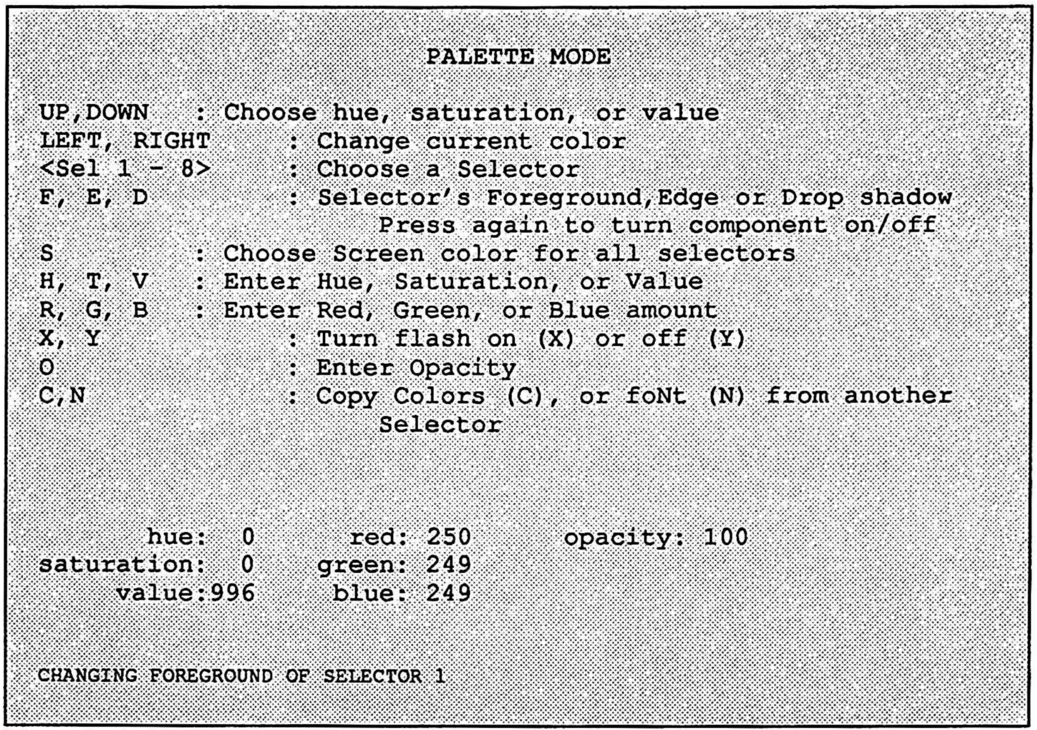
F	Foreground
E	Edge
D	Drop shadow

The box at the top right of the palette shows the color you are changing. The three bars show the hue, saturation and value components of that color. Each bar has a marker to indicate its current value; the white marker shows the currently selected bar. Use the [←] [→] [↑] [↓] keys to change the setting of that bar, or to pick a different bar.

To pick a different Selector, press **Sel 1** through **Sel 8.** To change the screen color, press **S.** The same screen color applies for all of the Selectors.

When you change the color of a Selector you *do not* automatically change the color of text previously typed with that Selector. Use **Text R** or **Text P** to retype the text with a new Selector setting.

In palette mode, the status monitor displays this menu:



```
                         PALETTE MODE

UP,DOWN    : Choose hue, saturation, or value
LEFT, RIGHT      : Change current color
<Sel 1 - 8>      : Choose a Selector
F, E, D          : Selector's Foreground,Edge or Drop shadow
                       Press again to turn component on/off
S          : Choose Screen color for all selectors
H, T, V    : Enter Hue, Saturation, or Value
R, G, B    : Enter Red, Green, or Blue amount
X, Y             : Turn flash on (X) or off (Y)
O                : Enter Opacity
C,N              : Copy Colors (C), or foNt (N) from another
                       Selector



      hue:  0       red: 250       opacity: 100
saturation:  0    green: 249
     value:996     blue: 249


CHANGING FOREGROUND OF SELECTOR 1
```

Menu 4: Palette

The bottom of the display describes the color you're changing: the red, green, and blue amounts; the related hue, saturation, and value; and the opacity.

The red, green, and blue amounts vary from 0 to 255. The higher the number, the brighter the color (0 = no color). With 256 possible values for each of red, green, and blue, you can create 256 x 256 x 256 colors, or over 16 million!

To make it easier to mix colors using red, green, and blue (what's brown? gold?), the 20-K uses the hue, saturation, and value (HSV) color space.

Hue is an angle from 0 to 360 degrees on a color wheel, where red is 120 degrees, green is 240 degrees, and blue is 0 degrees. When the amounts of red, green, and blue are equal (a shade of grey), the hue is undefined.

Saturation is a measure of how "pure" a color is. A fully saturated color is 100% pure, with no white in it. Reducing the saturation adds white to the color; reducing the saturation all the way to 0 gives you a shade of grey, no matter what the hue is. The 20-K controls saturation using an arbitrary 0-999 scale, where 999 represents maximum saturation.

Value is the total amount of light present. It is similar to luminance or brightness. As with saturation, the 20-K uses an arbitrary 0-999 scale. Maximum value (999) implies that at least one of red, green and blue has the maximum setting (255). Reducing the value lowers red, green, and blue in equal proportion. A value of zero produces black, no matter what the hue and saturation are.

A color with an ***opacity*** of 100 is opaque, and a color with an opacity of 0 is transparent. Opacity values between 1 and 99 produce translucent colors, i.e. the character color mixes with the background.

Now that we have the theory out of the way, we can describe the functions of palette mode:

Compose	Return to Compose mode.
[↑] [↓]	Select one of the hue, saturation, or value sliding scales. The selected scale is indicated by a white marker; the other two scales have black markers.
[→] [←]	Change the current color by moving the marker on the selected scale.
Sel 1 - Sel 8	Choose a new Selector.
F, E, D	Select the foreground, edge, or drop shadow of the current Selector, and turn it on. Press again to turn off. For example, **Sel 3 E E** turns off the edge of Selector 3, and **Sel 4 D** turns on the drop shadow of Selector 4. *HINT*: You can create outline characters by turning on the edge, and turning off the foreground like this: **Sel 2 E F F**. (Make the edge and screen different colors.)
S	Change the screen color of all of the Selectors. The screen color of the current text display also changes.

H, T, V	Set the Hue, saTuration, or Value of the current color. After you press H, T, or V, the status monitor prompts for the desired value. Type the number, followed by **Enter.**
R, G, B	Set the red, green, or blue amount of the current color. After you press R, G, or B, the status monitor prompts for the desired value. Type the number, followed by **Enter.**
X	Turn flash on for the current Selector.
Y	Turn flash off for the current Selector.
O	Set the opacity of the current color. The status monitor prompts for the desired value; type in the number followed by **Enter.** Translucent characters keyed over live video mix with the background video. *HINT:* You can create realistic-looking shadows by making the foreground opaque and the shadow translucent.
C	Copy another Selector's colors to the current Selector. The status monitor prompts for the Selector whose colors are to be copied.
N	Copy another Selector's foNt to the current Selector. The status monitor prompts for the Selector whose font is to be copied.

When you first start the 20-K, the Selectors are set to their default colors and fonts. To change the default settings, logout the current Selectors: **Confg Y S.**

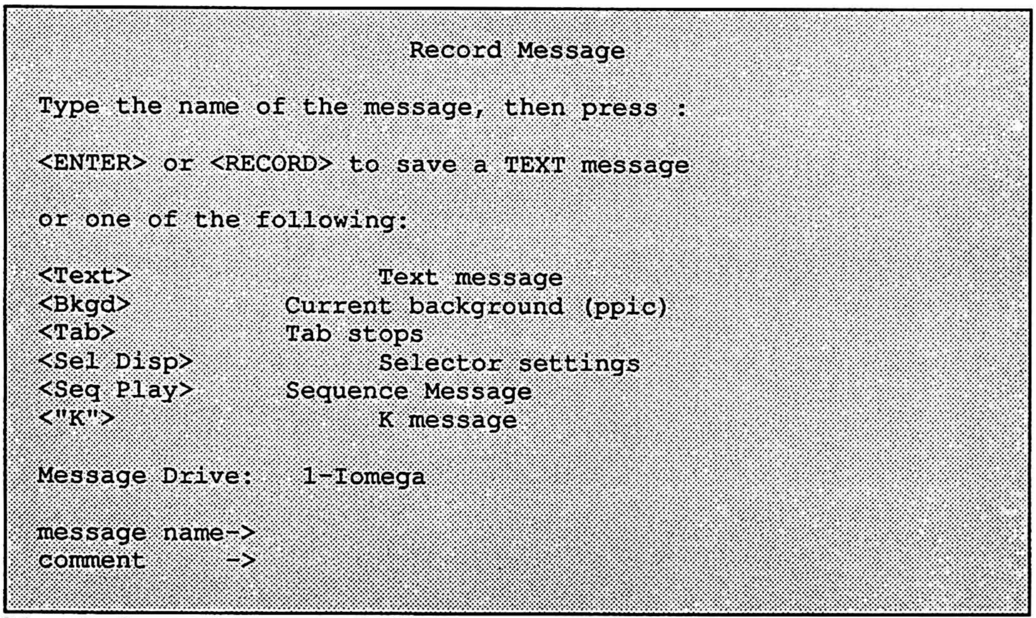
6. MESSAGES

6.1 Recording Messages

After you've composed a page of text, you can record it for later recall. We call this saved page a ***text message***. A text message records the current page of text, including your font and color choices, tab settings, and the current background (ppic), if any.

Text messages are recorded on the current ***message disk***. A single disk can store both fonts and text messages.

To record a message, first press **Rec**. The status monitor prompts with this menu:



```
                        Record Message

Type the name of the message, then press :

<ENTER> or <RECORD> to save a TEXT message

or one of the following:

<Text>                Text message
<Bkgd>          Current background (ppic)
<Tab>           Tab stops
<Sel Disp>            Selector settings
<Seq Play>      Sequence Message
<"K">                 K message

Message Drive:   1-Iomega

message name->
comment     ->
```

Menu 5: Record Message

Next, type the name you would like to give the message. Message names may contain up to 31 letters and/or numbers. They may also include spaces and punctuation. Here are some examples of valid message names:

```
10-K
12
Renbud
american league
map9
map9a
map10
qwerty!@#$%
```

While you are typing the message name, the following keys do the obvious: [→], [←], **Insrt, Home, Del,** and **Backspace.** When you've finished typing the name, press **Rec** or **Enter** to record the message on the selected message disk.

If you have previously recorded a text message, when you press **Rec** the next time you'll be prompted with the name of the previous message plus 1. This helps create a series of messages with sequential numeric names. If you don't want to use the prompted name, just type over it.

Next and **Prev** are helpful for message names that are completely numeric, or that end with a number. **Next** adds one to the message name and **Prev** subtracts one. **Read** displays the name of the last message read in.

If you try to record a message with the same name as one already recorded on your disk, **Rec** does not automatically replace it. The status monitor asks if you really want to record over the original message. Press **Y** or **y** to replace the original message.

Alt Rec re-records the current text page, overwriting the previous version. In Sequence or K Edit mode, **Alt Rec** re-records the current sequence or K program being edited. Use **Alt Rec** when you are modifying existing displays.

Alt Bkgd re-records the current ppic.

To record a partial page of text, place a record mark, **Text M,** on the last row of text to be recorded. (The record mark always appears at the end of the row, regardless of where the cursor is when you press **Text M.**) Only those rows of text from the cursor row to the record mark row will be recorded. Partial pages of text are useful for creating Roll and Crawl sequences (see Section 7.1).

When you **Read** a partial page of text, the text starts at the cursor row. If your partial page consists of exactly one row of text, **Read** does a character by character replacement, starting with the cursor character. Otherwise, it does a row by row replacement, starting with the cursor row.

If you have both text and a previously recorded ppic displayed, **Rec** records both the text and the ppic. When you read a text message that was recorded with an associated ppic, both text and ppic pop on simultaneously. To record just the ppic, use **Rec** `name of message` **Bkgd**. To record just text, press **Erase-Bkgd** first. See Chapter 8 for a discussion of ppics.

Menu 5 shows you other things besides text that can be recorded: Selectors, tab settings, ppics, sequences, and K programs. Type a message name, then press the appropriate key.

6.2 Reading Messages

To recall a recorded text message, press **Read**, type the name of the message, then **Enter** or **Read.**

When you press **Read**, the status monitor prompts with the name of the next existing message after the last one read. **Next** bumps the prompt to the next message name (in alphabetic order), and **Prev** backs it up to the previous name.

To reread a message, **Read Prev Enter.** To read a message with a long name, type only the first few characters followed by **Next Enter.**

When you read in a full page text message, the foreground is erased before the new text is read in. To combine two different text messages without erasing the screen, press **Alt Read. Alt Read** reads in a text message starting with the cursor row. Rows above the cursor are unaffected.

Read-Next saves time and keystrokes. It reads the next text or ppic message from the directory and pops it on-air. If Preview is selected, (with **Confg V**), then **Read-Next** pops the message from the status monitor to the on-air monitor and reads the next image into the status monitor monitor.

HINT: Messages named `ALTa` through `ALTz` (don't leave a space between `ALT` and the letter) can be recalled without using **Read,** by pressing **Alt a, Alt b,** etc. Use this trick to read messages in a hurry. (It works for sequences and animations too.)

6.3 Deleting Messages

You can get rid of unwanted messages by ***deleting*** them. There are two ways to do this:

1. Press **Dir D** and fill in the Delete menu, then press **Enter**.
2. Press **Del Y** from the directory display (Section 6.4).

Once a message has been deleted, it is gone forever.[1] Be careful.

6.4 Selecting Message and Font Drives

The 20-K reads and records messages on the current ***message disk***. When you type text, the 20-K reads the appropriate fonts from the current ***font disk***.

If you have a multi-drive system, you must tell the 20-K which drive to use for messages and which drive to use for fonts. You can use the same drive for both, or you can store messages on one drive and fonts on the other.

Press **Dir S** followed by a number on the numeric keypad to tell the 20-K which drive you are using for messages and fonts. We call this process ***drive select***.

The currently selected message and font drives are displayed on the status monitor.

These are the external disk drives available for your 20-K:

10 megabyte Iomega
20 megabyte Iomega
300 megabyte Wren

---

[1] Some messages can be resurrected, even after they've been deleted, but in general don't rely on it. See Section 10.2, **Disk-Util R**.

6.5 Directory Displays

Press **Dir M** to call up a list of all the messages stored on the selected message disk. The cursor highlights one of the messages. The following keys help you move around the directory display:

Next, Shift-Row + [↓]	Display the next page of the directory.
Prev, Shift-Row + [↑]	Display the previous page of the directory.
[↑] [↓]	Move the cursor up or down one line.
Alt [↑]	Move the cursor to the top line of the current page.
Alt [↓]	Move the cursor to the bottom line of the current page.
Home	Display the first page of the directory.
Alt Home	Display the last page of the directory.
Shift-Char + [↑] [↓]	Scroll the directory one line in the direction of the arrow. The cursor remains on the highlighted message.

You can read and delete messages directly from the directory display, and play sequences and effects:

Read	Read the highlighted message (if it is a message type recognized by the Character Generator).
Del Y	Delete the highlighted message.
Seq-Play	Enter sequence mode. If the highlighted message is a sequence, it is loaded into the sequencer.
Effct	Go to the effect menu. When not in a Preview mode, the highlighted message will be displayed on the effect prompt line, after you choose an effect.

The message directory displays the message type, name, comment and size of each message. You can start the directory display with any message name, or restrict which messages are shown:

N	*Change Starting Name.* The status monitor prompts for a message name. Type a name, then press **Enter.** The directory display starts with that name.
T	*Display One Type of Message.* The status monitor prompts for a message type. Enter a type, then press **Enter**. The directory shows only that message type.

These are the 20-K message types stored in the directory:

`all`	All types of messages, including fonts
`anim`	Animation messages
`font`	Fonts
`kpgm`	K programs
`msgs`	All types of messages, except fonts
`ppic`	Palette pictures
`clck`	Clock messages
`sels`	Selectors
`seq`	Sequences
`tabs`	Tab stops
`text`	Text messages
`data`	Graph data (Presentation Graphics option)
`grph`	Graphs (Presentation Graphics option)
`slid`	Slides (Presentation Graphics option)
`pots`	Paint pot colors (K-Paint option)
`wmap`	Weather text (Weather option)
`wpal`	Weather palettes (Weather option)
`wseq`	Weather sequences (Weather option)
`stil`	Graphics Factory full-color image
`imag`	DPS-1 or CBG/Texta Third Plane image

Animations prefaced with the $ are small enough to play back on a 5-K; animations prefaced with the @ require the 30-K for play back.

Font F displays a directory of the selected font disk, including the font type, number, comment and size.

The <u>TYPE</u> column shows the font type:

`AA`	***Anti-aliased font.***
`STD`	***Standard font.*** The standard 20-K font.
`PST`	***Preset-color fonts.*** Used for logos and other user-created fonts. Preset-color fonts have a specific palette associated with them.
`MSTR`	***Master font.*** Used to create anti-aliased fonts.

You can start the Font directory with any font number, or assign a font to a selector:

N	Start display at a given font number. Type the desired font number, then press **Enter.**
A	Assign the highlighted font to a selector. Press **A**, then press a Selector.

6.6 Copying Messages and Fonts

Press **Dir** to call up the following menu:

```
                        Directory Functions

M           Message directory display
F           Font directory display

S           Select disk for messages/fonts

C           Copy messages/fonts to another disk
T           converT messages/fonts

I           Input messages from data port
O           Output messages to a data port
P           Print messages

D           Delete messages/fonts from disk
N           commeNt a message/font
R           Rename a message/font
```

Menu 6: Directory Functions

Dir C

Copy messages or fonts from one disk to another. The status monitor asks for the first and last messages to be copied. To copy only a single message, leave `last message name` blank. To copy all the messages on the disk, leave first and last message name blank.

If you like, rename the message(s) by filling in the `new message name` entry. If you leave it blank, the messages will be copied with their original names. The messages are copied from the `FROM` disk to the `TO` disk. It's all right to copy messages to the same disk they already live on, say, to rename them.

WARNING: Copy overwrites any messages using that name without a warning.

You can restrict which type of message is copied by filling in `Message type`. To copy both messages and fonts select `all`.

6.7 Other Directory Functions

This section covers the remaining choices in the **Dir** menu.

Dir T

Convert messages. Convert messages between the 20-K, Graphics Factory and other K-series products.

The status monitor asks for the first and last messages to be converted. To convert only a single message, leave `last message name` blank. To convert all the messages on the disk, leave first and last message name blank.

If you like, rename the message(s) by filling in the `new message name` entry. If you leave it blank, the messages will be converted with their original names. The messages are copied from the `FROM` disk to the `TO` disk. We recommend this for large messages.

You can restrict which type of message are converted by filling in `Message type`. These are the messages you can convert: `msgs, text, ppic, sels, tabs.`

Other types of messages are listed:

`imag`	Four-field full-color images (from DPS, Turbo, Still Store). See **Bkgd Q** for color, **Bkgd T** for black and white.

We can't convert the following message types from the Graphics Factory as yet, but the Graphics Factory can convert them into a form usable by the 20-K:

`stil`	Full-color stills (GF)
`4fld`	Four-field full-color images (from the GF Frame Grabber)

`Maximum blend colors`. When converting ppics from one Dubner product to another (i.e. changing resolution), blending maintains the image quality. The more colors there are in a ppic, the harder it is to blend.

CAUTION: Anti-aliased fonts use many colors. If you intend to type anti-aliased fonts over a ppic, use fewer blending colors.

`Source machine`. The status monitor lists all the Dubner products. Select the product where the message(s) to be converted originated.

`Destination machine`. The status monitor lists all the Dubner products. Select the product where the message(s) to be converted will be used.

Dir I (input)
Dir O (output)

Transfer messages between two Dubner graphics generators via a modem or direct connection of serial ports.

To transfer messages:

1. Connect the two machines with an RS-232 or RS-422 cable or modem. You can use any port that is not already in use (by keyboard, tablet, etc.).
2. Use **Congf P** (Section 10.3) to configure the port `Protocol` as `RS-232` or `RS-422`. In the `Usage` column, use **Prev** or **Next** to set the usage to `DATA I/O`. Be certain that the sending and receiving ports match, e.g. `Baud Rate` and `Protocol`.
3. On the receiving machine, press **Dir I** and specify the receiving drive. If you like, rename the message(s) by filling in the `new message name` entry. If you leave it blank, the messages will be copied from the sending machine with their original names.
4. On the sending machine, press **Dir O**. You can specify message type and first and last message name.

To transfer messages/fonts from a CBG or Texta:

1. Configure a `DATA I/O` port on the 20-K.
2. Press **Dir I** on the 20-K.
3. Type **Do** `send,` *message number* **Enter** on the CBG or Texta.

When transfering a preset-color font, send the associated palette first.

Dir P

Print messages on an Epson or Texas Instruments printer. Connect the printer to any 20-K port and use **Congf P** to configure the port `Protocol` to be `RS-232`, `Usage` to be `PRINTER` and `Handshake` to be `X-IN`. Be sure the Baud rate of the 20-K port and the printer match.

Types of messages that you can print include: Text data (not a visual representation of the display), K programs, Sequences, Tab and Font data. You can also print the directory.

Esc P prints the status monitor display, with the exception of the keyboard language layouts.

Dir D

Delete messages or fonts from a disk. The status monitor asks which messages to delete. You get a second chance to cancel the deletion before the messages are actually deleted.

Dir N

Comment a message or font. In addition to a call-up name or number, messages can have a 31 character comment. This comment is displayed in the directory display, and on the status monitor after the message is read in.

Dir R

Rename a message or font. Use this command to change the name of a message or font. The message has a new name. If you look for it in the Directory under the old name, you won't find it.

To find the message under the original name *and* the new name, use **Dir C** to copy the message with the new name.

7. PLAYBACK EFFECTS

The 20-K plays back messages using a variety of effects, from the traditional Roll and Crawl to Dubner exclusives like Climb and Scanwipe. The 20-K's Sequencer plays back a series of messages or effects, either automatically or triggered by you.

7.1 Playback Modes

Effects are played back in Preview or Non-Preview mode. You can choose to preview (or not preview) the image before using a real-time transitional effect. These playback modes are controlled by **Confg V** (Section 10.2).

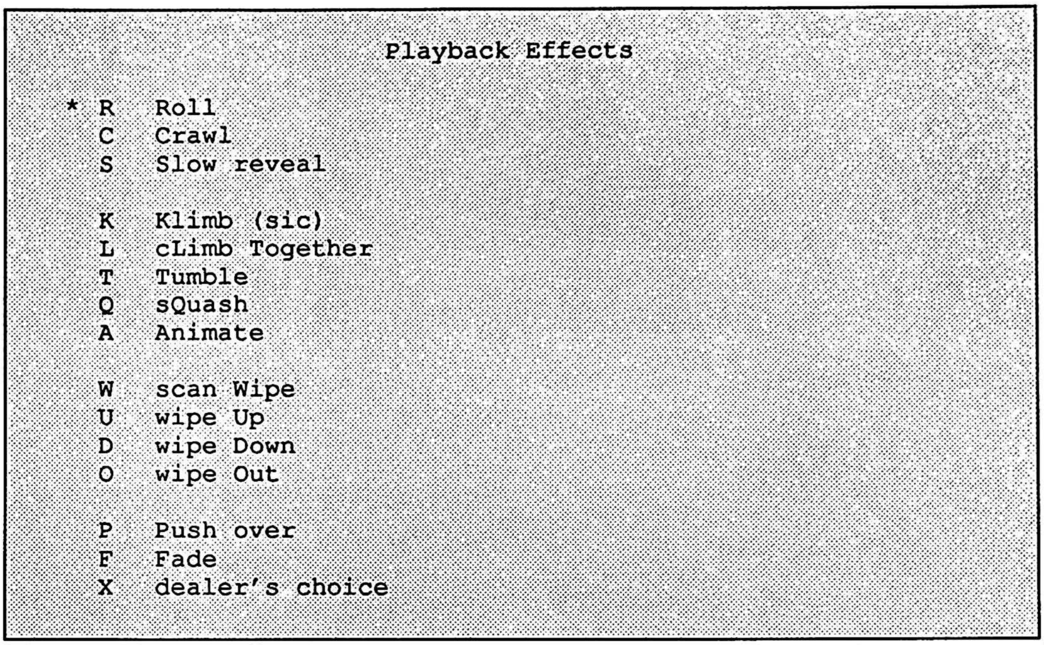
Preview. The black and white status monitor serves as a preview monitor. The text of the initial image of an effect appears on the status monitor (except in the sequencer—see Section 7.2). Playback then transfers the ***preset*** channel to the ***program*** channel, just like a switcher does.

In Preview mode, you read the image, set up the effect, then trigger it.

Non-Preview. There is no preset channel. You'll be prompted for the name of the message you want to play back, but you won't get to see it until the playback effect happens.

In Non-Preview mode, you set up the effect, the status monitor prompts for the message name, then you trigger the effect.

To initiate a playback effect, press **Effct**. The status monitor displays this menu:



```
                      Playback Effects

  * R   Roll
    C   Crawl
    S   Slow reveal

    K   Klimb (sic)
    L   cLimb Together
    T   Tumble
    Q   sQuash
    A   Animate

    W   scan Wipe
    U   wipe Up
    D   wipe Down
    O   wipe Out

    P   Push over
    F   Fade
    X   dealer's choice
```

Menu 7: Playback Effects

Press the appropriate letter. In non-preview mode, you'll be prompted for a message name.

Next, the status monitor requests a speed selection. The numeric keypad digits **1** through **9** control the effect's playback speed, where **1** is the slowest speed, and **9** is the fastest.

You can change the speed at any time during the effect. Speed **0** pauses the effect; press **New Line** to step through the effect one frame at a time. To cancel or stop an effect, press **Compose**. When you cancel an effect, what you see on the screen becomes the current ppic.

Some effects only apply to text messages; these are noted below. Otherwise, all of the following effects can be performed on text and ppics.

Effct R	***Roll*** (slide up vertically) a series of text messages. The Roll begins with the message displayed on the preset channel (or the named message in non-preview mode) and continues with sequential text messages. The Roll ends with any non-text message (usually a Selector message recorded after the last page of the Roll). Use the Sequencer (Section 7.2) to program automatic speed changes and pauses between pages. If you have problems setting the vertical spacing between text messages use **Text M** to record partial pages (Section 6.1).
Effct C	***Crawl*** (slide across the screen from right to left) a series of text messages. The Crawl begins with the message displayed on the preset channel (or the named message in non-preview mode) and continues with sequential text messages. The Crawl sequence ends with a non-text message (usually a Selector message recorded after the last page of the Crawl). Use the Sequencer to program automatic speed changes and pauses between pages. Text messages Crawl across the bottom row of the screen when the cursor is in the Home position. Otherwise the messages Crawl across the cursor row. The entire Crawl appears in the screen color of the first text message.
Effct S	***Slow Reveal*** a text message. The characters of the message are popped on one at a time. To Slow Reveal one row at a time, use single row messages created with **Text M**.
Effct K	***Climb*** a text message. Each row of the message rolls up into place one row at a time.
Effct L	***Climb Together*** a text message. All the rows of the message roll up into place simultaneously.
Effct T	***Tumble*** a message. The old image flips off and the new image flips on.
Effct Q	***Squash*** a message. Like Tumble except the image never goes upside-down.

Effct W	***Scan-Wipe*** a message. A Scan-Wipe is a random scan-line-by-scan-line wipe. This effect arouses strong reactions from people; you will either love it or hate it.
Effct U D O	***Wipe Up, Down*** or ***Out*** to the new message.
Effct P	***Push*** a message onto the screen. The status monitor asks in which direction the images should travel. Respond with a cursor arrow key, or **Home** for a random choice.
Effct F	***Fade*** the current message out, then fade in the new one. If the linear keyer is enabled, the fading attenuates the key signal (that is, the image fades to become fully transparent). Otherwise, the image fades to screen color.
Effct X	***Dealer's choice.*** Reveal a message using an effect chosen at random from: Tumble, Squash, Scan-Wipe, Wipe Up, Wipe Down, Wipe Out, Push Left, Push Right, Push Up or Push Down.
Effct A	Play back the specified ***Animation***. An animation is a series of messages played back in rapid succession.

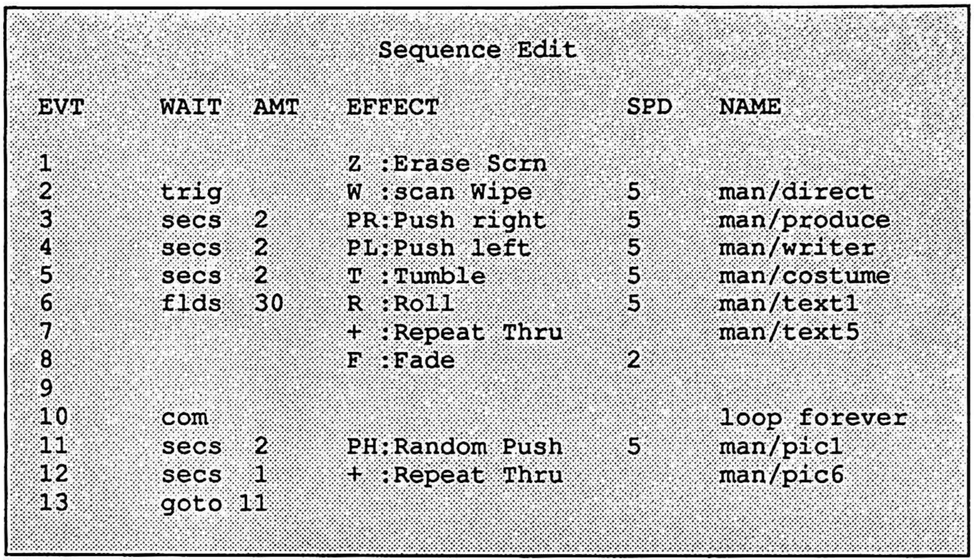
HINT for controlling the 20-K from an external computer: During an effect, the 20-K continues to process any keys that you type looking for speed changes. When an external computer controls the 20-K any keystrokes transmitted while an effect is in progress are lost. To prevent this have the external computer send a **Tab** immediately after it sends the speed to start the effect. This tells the 20-K to ignore all keys except **Compose** for the duration of the effect. Any other keys transmitted after **Tab** are saved and executed after the effect completes.

7.2 Sequences

A ***sequence*** is a list of message names grouped together for automatic playback. The sequence specifies *how* each page is to be recalled (by a normal read or by a special effect) and *when* it is to be recalled (at a fixed time or on demand).

Let's try an example of a sequence. Press **Seq-Play** to enter ***sequence edit mode*** and display the current sequence on the status monitor. If you have a 20-K distribution disk handy, **Seq-Play Read** `man/sequence` **Enter Enter**.

Here is an example of the sequence edit display:



```
                        Sequence Edit

EVT     WAIT  AMT   EFFECT            SPD   NAME

1                   Z :Erase Scrn
2       trig        W :scan Wipe      5     man/direct
3       secs  2     PR:Push right     5     man/produce
4       secs  2     PL:Push left      5     man/writer
5       secs  2     T :Tumble         5     man/costume
6       flds  30    R :Roll           5     man/text1
7                   + :Repeat Thru          man/text5
8                   F :Fade           2
9
10      com                                 loop forever
11      secs  2     PH:Random Push    5     man/pic1
12      secs  1     + :Repeat Thru          man/pic6
13      goto  11
```

Menu 8: Sequence Edit

Don't be intimidated by all the words on the sequence display. Very little typing is actually required to enter a sequence. Before we discuss individual keystrokes, let's first take a look at what this example does.

Press **Home** followed by **Enter** to start the sample sequence. Look carefully at the sequence display. Each line describes an event:

Event 1	Erases the screen.
Event 2	Press **Home** or **Enter** to trigger the effect. `man/direct` scanwipes on at speed 5.
Event 3	Two seconds later `man/produce` is pushed on.
Event 4	`man/writer` pushes on two seconds later.
Event 5	After a two second wait `man/costume` tumbles on.
Event 6-7	After a half second (30 field) wait the series of messages `man/text1` through `man/text5` rolls on.
Event 8	Finally the last page fades out to a blank screen.
Event 9	An empty row. The sequencer skips ahead automatically.
Event 10	A comment. "Loop forever."
Event 11-12	Does a series of random pushes of messages `man/pic1` through `man/pic6`. Waits two seconds before the first push, then waits one second before each successive push.
Event 13	Returns to Event 11. The random pushes repeat forever.

The `WAIT` and `AMT` columns tell the sequencer how long to wait before starting the event on that line. Use **Next** and **Prev** to scroll through these `WAIT` possibilities:

`secs:`	Wait `AMT` seconds before continuing. This includes set-up time for the effect.
`flds:`	Wait `AMT` fields before continuing. (NTSC: 60 fields per second, PAL: 50 fields per second)
`trig:`	Pause the sequencer until the GPI trigger is closed or **Home** or **Enter** is pressed.
`exit:`	Interrupt playback and return the sequencer to edit mode.
`goto:`	Go directly to the event number specified in the `AMT` column.
`loop:`	Loop all messages following this event through to `done`. Specify the number of times to loop in the `AMT` column. Do not nest loops.
`done:`	Finish a loop.
`com:`	Signifies a Comment. Use `COM` to add notes to your sequence or to temporarily remove an event from the sequence.

The `EFFECT` column displays an effect abbreviation and name. In addition to all the effects listed in the Playback Effects menu there are also entries for

`Read`
`Read-Next`
`Erase-Text`
`Erase-Bkgd`
`Erase-Screen` (foreground and background)
`Swap`
`Play` (another sequence)
`Repeat-Thru` (specifies the last message in a series)

The optional `Grow setup` and `Grow bars` (for Presentation Graphics) and `Command` (do a K program) are also listed.

The `SPD` column sets the speed for the effect. Speed 0 causes the sequencer to wait for you to press a speed digit on the keyboard. (You can step through animations, frame by frame by pressing **New Line**.) A speed 1-9 combined with a `trig` in the `WAIT` column will wait for a trigger then start the effect at that speed.

The `NAME` column indicates the message name. When used with the `Repeat-Thru` effect all messages in alphabetic order between the name on the previous line and the `Repeat-Thru` line are displayed in sequence using the effect indicated on the previous line. When left blank the effect will be done to a blank screen.

Use the following keys to play back a sequence from Sequence Edit mode:

Enter	Play the sequence starting at the cursor event.
Seq-Play	Interrupt playback and return to edit mode. Put the cursor at the next event.
Home or **Enter**	Simulate the GPI trigger when the sequence is waiting for a trigger.
0 - 9	Change the speed of the effect currently playing.
Compose	Stop playback and return to compose mode.

Use the following keys to edit a sequence:

Next, Prev	Scroll through the possible choices for this column. *HINT*: In the `EFFECT` column you can also type the effect's identifying letter(s) directly. For example type **T** for `Tumble` or **PL** for `Push Left.`
[↑] [→] [↓] [←] **New Line**	Move the cursor in the usual manner.
Home	Move the cursor to event 1.
Alt Home	Move the cursor to the last event of the sequence.
Alt [↑]	Move the cursor to the top row of the current page.
Alt [↓]	Move the cursor to the bottom row of the current page.
Alt [←]	Move the cursor to the `WAIT` (first) column.
Alt [→]	Move the cursor to the `NAME` (last) column.
Tab	Move the cursor to the next column.
Alt Tab	Move the cursor to the `NAME` column.
Insert	If the cursor is on the `WAIT` column insert a blank event into the sequence. Otherwise enter insert mode to insert characters into the field.

Alt Insert	Insert a blank event into the sequence.
Del	If the cursor is on the `WAIT` column delete the event from the sequence. Otherwise delete the current character from the field.
Alt Del	Delete this event from the sequence.
Kern/Xchg [↑] **Kern/Xchg [↓]**	Swap this event with the one immediately before or after.
Shift-Char [↑] **Shift-Char [↓]**	Scroll the screen a row at a time.
Shift-Row [↑] **Shift-Row [↓]**	Scroll the screen a page at a time.
Erase-Text	Delete all events from the current sequence.

The following keys also work in sequence edit mode:

Erase-Bkgd	Clear the "program" channel (both text and background).
Rec *sequence name* **Enter**	Record the current sequence.
Alt Rec	Re-record the current sequence.
Read *message name* **Enter**	Read text and ppics. If the message name is a sequence you'll be asked if the new sequence should replace the current sequence or be inserted into the current sequence.
Alt Read *message name* **Enter**	Read text at the cursor row. If the message name is a sequence, insert the specified sequence into the current sequence without asking.

Some special playback considerations:

Rolls: To Roll a series of messages, either enter the message names explicitly as separate events, or use the `Repeat-Thru` `EFFECT` to specify the last message to Roll. To program automatic pauses and speed changes into a roll, enter the message names as separate events.

Crawls: Specify multiple page Crawls the same way as Rolls. Text usually Crawls along the bottom of the screen. It can be placed elsewhere by `C` in the `EFFECT` column with a row number from `1` to `9`.

Animations: The `EFFECT` column requires one or two letters for animations:

`A`	for animate forward
`AB`	for animate backwards
`AO`	for oscillate once (forward and back) and quit
`A1-A9`	to play the animation forward multiple times

To play back multiple animations sequentially, specify them as consecutive events. Whether or not there will be a delay between the individual animations depends on their total size.

To repeat a sequence forever, follow the last line of the sequence with a `goto` to event 1.

8. PPICS

The 20-K has a foreground and a background. As you have already seen, the foreground is used for composing text displays. But what about the background? It is used for creating ***ppics***.

A 20-K ***ppic*** is a full-screen color image. It may have up to 256 colors. ppics may be entirely opaque or portions may be translucent or transparent. It is always recorded with its own palette. (ppic stands for palette picture.)

ppics are created in several ways:

- By ***weaving*** foregrounds into the background plane
- By ***creating*** ppics with 20-K functions, such as horizontal bars
- By ***converting ppics*** from CBG, Texta or other Dubner products
- By ***purchasing*** Dubner's "Backgrounder" package of artwork
- By ***digitizing*** camera input with the K-series Digitizer (option)
- By ***scanning*** color pictures with an RGB scanning device (option)
- By ***painting*** ppics with K-Paint (option)
- By ***graphing*** data with Presentation Graphics (option)

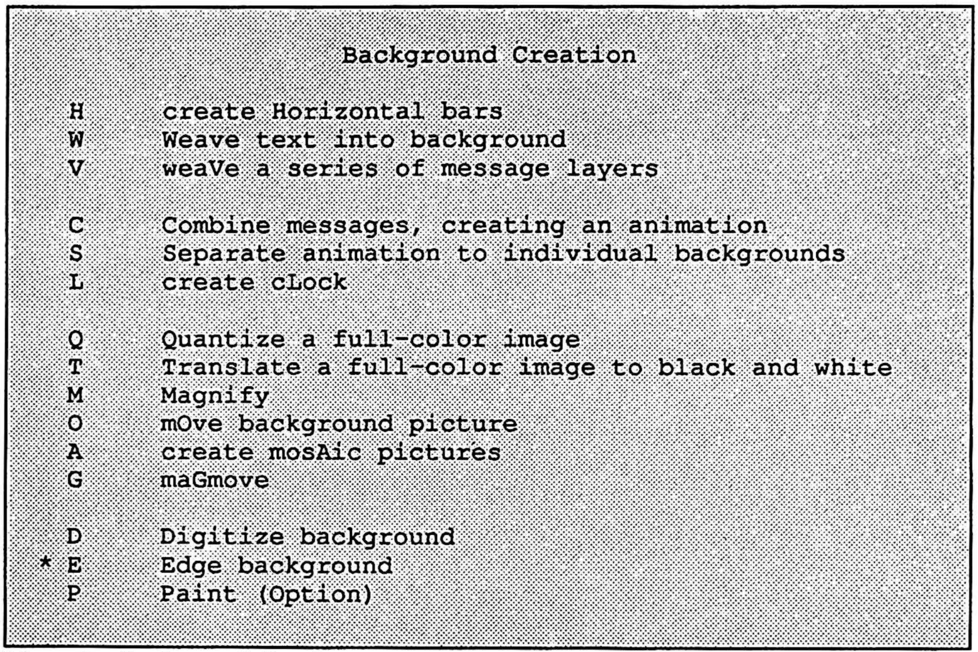
To read a ppic, do what comes naturally: **Read** *name* **Enter**. The new ppic completely replaces the previous one.

To erase the ppic, **Erase-Bkgd**. This sets the background plane to screen color. (See "Palette Mode" in Section 5.2.)

To record the currently displayed ppic, **Rec** *name* **Bkgd**. To record the currently displayed text *and* ppic together, **Rec** *name* **Enter**.

8.1 Creating ppics

The Background Menu shows all the functions that create and manipulate ppics. Press **Bkgd** to bring up this menu:



```
                    Background Creation

     H      create Horizontal bars
     W      Weave text into background
     V      weaVe a series of message layers

     C      Combine messages, creating an animation
     S      Separate animation to individual backgrounds
     L      create cLock

     Q      Quantize a full-color image
     T      Translate a full-color image to black and white
     M      Magnify
     O      mOve background picture
     A      create mosAic pictures
     G      maGmove

     D      Digitize background
    * E     Edge background
     P      Paint (Option)
```

Menu 9: Background Creation

Bkgd H	*Horizontal bars.* Follow the status monitor prompts to create horizontal bars. The foreground of the current Selector determines the color.
Bkgd W	*Weave* foreground text into the background. The new ppic will be the composite of the foreground text and the background; the original text remains in the foreground. *HINT*: You can create interesting ppics with the BOX font of graphic symbols.
Bkgd V	*Weave a series* of message layers. This command overlays one set of images over a second set of images and records the resulting series. The input messages may be text or ppics; the results will be ppics, which may then be combined into an animation **(Bkgd C)**.

If the two original series do not contain the same number of images, the shorter series is cycled until the longer series is completed. For instance, if a single message is specified for the top layer series, that message will be woven onto each image of the bottom layer series.

Bkgd C *Combine* a series of messages into an animation message and record the animation. The input messages may be text and/or ppics. Play back the animation with **Effct A** or **Effct N.**

Bkgd S *Separate* an animation into a series of ppics and record them on the selected message disk.

Bkgd L *Create Clock.* Clocks come in two separate forms: *Digital* or *Analog* (face) style. Up to four clocks may run simultaneously; they may count forward or backward; they can be triggered to stop or start individually or all together.

A digital clock is a text message which serves as a template for font style, colors and position on the screen. The colors (including the screen color) and font number of the exclamation point "!", determine the font and colors of the displayed clock. The position of the template determines where on the screen the clock will be displayed. You can display the digital clock(s) with a corresponding + or - sign.

The following is the template for the digital clock:

`!#+HH:MM:SS.T` Do not leave spaces in the template.

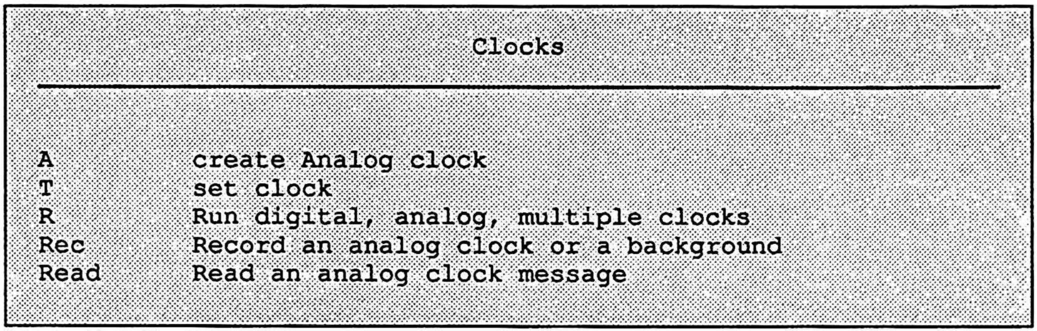
`!`	Indicates the digital clock and the font and colors of the displayed clock.
`#`	Clock ID. Substitute numbers 1 through 4.
`+/-`	Optional sign qualifier. If not specified, no sign will be displayed. + displays - when counting down, + when counting up. - displays - when counting down, nothing when counting up.
`HH`	Hours
`:`	Hours, minutes, seconds separator. You're not restricted to the colon; you can use any character as a separator as long as you use the same character.
`MM`	Minutes
`SS`	Seconds
`.`	Seconds and tenths of a second separator. Can be any character.
`T`	Tenths

Record this digital clock template as a text message. It may be recorded with an associated ppic.

An analog clock has a face, hands, tick marks, and the center dot. All parts may have different colors, and may be displayed or not. Hands may be rectangular, triangular or off. You can create arrow shaped hands by selecting the rectangular hand field, and turning the tip on.

Tick marks may be circular or rectangular. The default uses the attributes of the previous defined tick mark. For example, the fifteen minute tick mark in the sample below, will be the same size, shape, and color of the 12 o'clock tick mark.

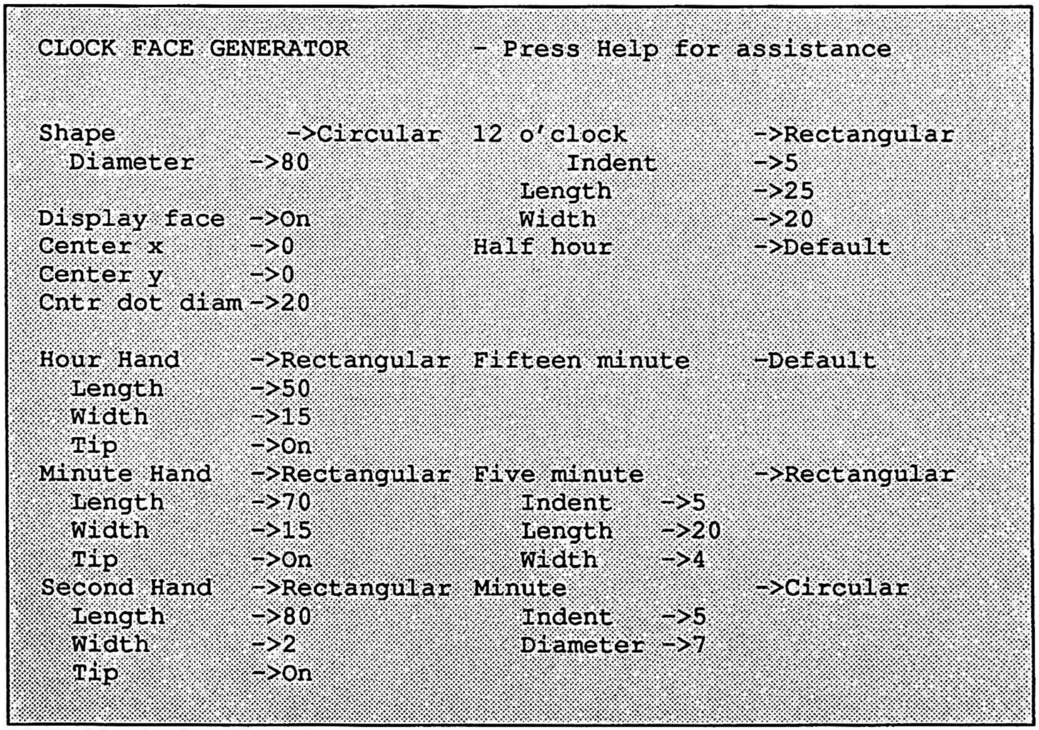
To create an analog clock, to set the clock, and to run the digital, analog or multiple clocks press **Bkgd L** to see this menu:



```
                         Clocks
-------------------------------------------------------------

A          create Analog clock
T          set clock
R          Run digital, analog, multiple clocks
Rec        Record an analog clock or a background
Read       Read an analog clock message
```

Menu 10: Clocks

Bkgd L A *Create an Analog clock*

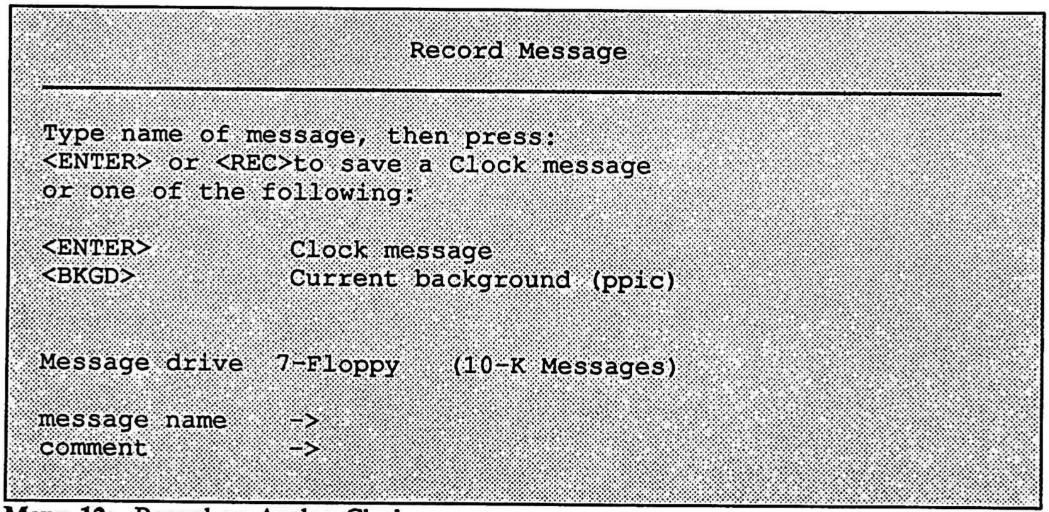


```
CLOCK FACE GENERATOR          - Press Help for assistance


Shape           ->Circular 12 o'clock          ->Rectangular
  Diameter    ->80              Indent         ->5
                             Length            ->25
Display face ->On            Width             ->20
Center x     ->0           Half hour           ->Default
Center y     ->0
Cntr dot diam->20

Hour Hand    ->Rectangular Fifteen minute      -Default
  Length     ->50
  Width      ->15
  Tip        ->On
Minute Hand  ->Rectangular Five minute         ->Rectangular
  Length     ->70            Indent    ->5
  Width      ->15            Length    ->20
  Tip        ->On            Width     ->4
Second Hand  ->Rectangular Minute              ->Circular
  Length     ->80            Indent    ->5
  Width      ->2             Diameter ->7
  Tip        ->On
```

Menu 11: Analog Clock Create

Use the following keys in the Analog clock menu:

[←][→][↑][↓]	Move around the menu.
Pal	Change colors, opacity levels of the various clock parts.
Next, Prev	Scroll through the menu field options.
Bkgd	Weave the clock face into the background. Use this to build up several clock faces.
Erase-Bkgd	Erase the screen. Use to clean up after several weaves.
Quit	Quit Analog Clock Create without keeping the clock face.
Compose	Leave Analog Clock Create keeping the clock face as a ppic.
Enter	Redraws the clock face.
Effct	Goes to Set the clock. Set the hands for the clock face. (Only works for clock ID 1.) Use this effect to create static ppics.
Read	Read an analog clock message (descriptors).
Rec	Record the Analog clock or a clock face ppic.



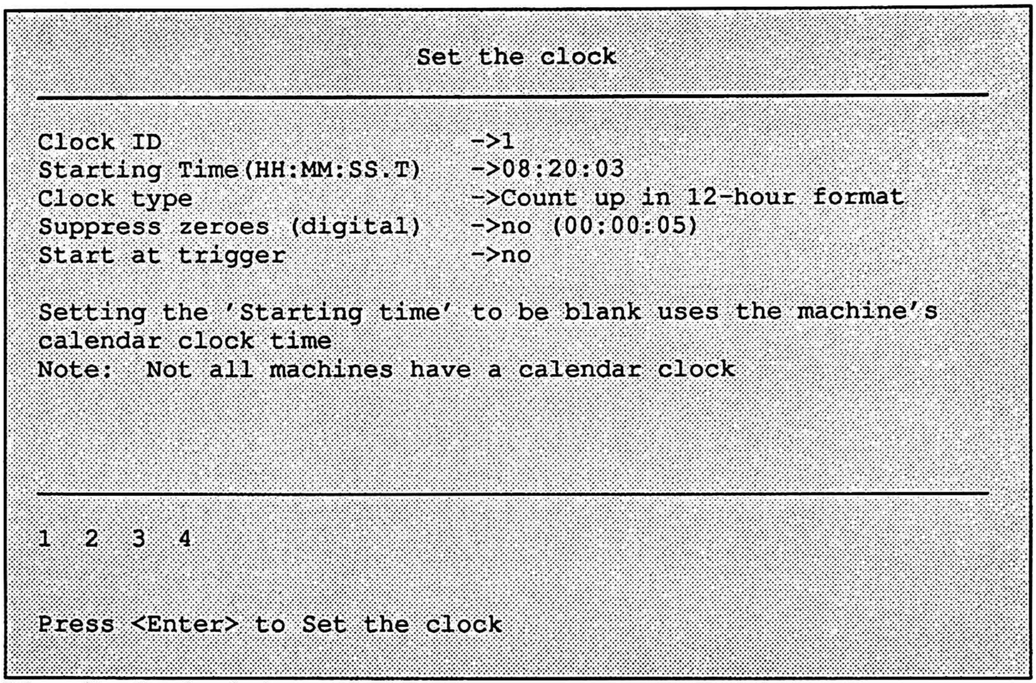
```
                        Record Message
______________________________________________________________

Type name of message, then press:
<ENTER> or <REC>to save a Clock message
or one of the following:

<ENTER>          Clock message
<BKGD>           Current background (ppic)


Message drive  7-Floppy   (10-K Messages)

message name     ->
comment          ->
```

Menu 12: Record an Analog Clock

Bkgd L S

Set the clock. You can set each clock to run in one of four ways:

Count up in 12 hour format
Count down to 0:00 and stop
Count down to 0:00 and up
Count up in 24 hour format



```
                        Set the clock
--------------------------------------------------------------

Clock ID                     ->1
Starting Time(HH:MM:SS.T)    ->08:20:03
Clock type                   ->Count up in 12-hour format
Suppress zeroes (digital)    ->no (00:00:05)
Start at trigger             ->no

Setting the 'Starting time' to be blank uses the machine's
calendar clock time
Note:  Not all machines have a calendar clock



--------------------------------------------------------------

1  2  3  4


Press <Enter> to Set the clock
```

Menu 13: Set the clock

Bkgd L R

Run the clock. Specify the digital clock text message template or the single analog clock.

You can use the keyboard trigger to start and stop the clocks. While the clocks are running, press the Clock ID to stop or start them (i.e. press **1** to start or stop Clock 1).

Home

starts all clocks that are stopped and stops all clocks that are running.

0

(zero) starts all clocks that are stopped.

Once you've learned how to set and run clocks, you may want to use the Do commands `sclock` and `rclock`. This alternative is usually faster for the experienced operator. See Chapter 11.

Multiple Clocks. You can run multiple analog clocks or a combination of analog and digital clocks simultaneously.

Multiple analog clocks. Create a text message that looks like this:

@*#analog clock name*@
@*#analog clock name*@

@	Indicates the beginning and end of an analog clock message.
# Clock ID	Substitute with a number from 1 - 4.
analog clock name	The name of the analog clock message recorded in **Bkgd A**.

The coordinates in the analog clock message determine where the clock(s) will run on the screen. If a ppic message is specified with the text message, only the hands of the analog clock will be displayed.

Combination of analog and digital clocks. Include both the analog and digital text messages:

@*#analog clock name*@
`!#+HH:MM:SS.T`

The position of the digital text message determines the position of the digital clock on the screen.

Store Turbo Image on 20K disk & then Quantize

Bkgd Q

Doqrgb(s) #

DO NOT LOAD IMAG just image number

Quantize (reduce the number of colors in) a full-color "still" and turn it into a 20-K ppic.

Full-color stills are images that were either camera-captured, scanned or painted on these Dubner products: DPS-1/Turbo, Dubner Still Store.

Full-color stills can easily exceed the 256-color maximum of a 20-K ppic. To display these images on the 20-K, it is necessary to reduce the number of colors in the image. **Bkgd Q** uses a sophisticated image processing algorithm to accomplish this with the least possible image degradation.

The following are the prompts for the Quantize menu:

`Old message name`. Enter the message name of the image you wish to convert; for CBG/Texta, DPS-1/Turbo and Dubner Still Store, enter the message number. Third Plane and Graphics Factory images are identified in the directory display as type `stil`; DPS-1/Turbo and Still Store images are identified as type `imag`. Only these types of messages can be quantized.

`Number of colors (1-250)`. The maximum number of colors a 20-K ppic may have is 256. However, Quantize limits you to 250. This saves a few colors for typing text over the ppic. *CAUTION*: Anti-aliased fonts use many colors. If you intend to type anti-aliased fonts over a quantized ppic, use fewer colors when you quantize.

Bkgd T

Remove color from a full-color DPS-1/Turbo, Dubner Still Store or Third Plane image, turning it into a black and white 20-K ppic. The ppic will have 16 grey levels. Use this function to "black-and-white-ize" new movies to make them look old.

Bkgd M

Magnify a ppic. Press 2-9 to magnify up to 9 times the original size, or press **Next** and **Prev** to magnify or demagnify continuously. The status monitor displays the x and y location of the center of the image. The status monitor also displays the red, green and blue values of the pixel under the cursor.

The arrow keys move the ppic one pixel at a time. **Shift-Char/arrows** move the ppic ten pixels at a time.

A CLEVER TRICK: Press 1 to move the unmagnified ppic. **Enter** leaves magnify and keeps the magnified picture in its new position. **Compose** leaves magnify and restores the original picture.

Bkgd O

ppic move. Move a ppic by entering a horizontal and vertical displacement, with 0 being in the center.

Compose leaves ppic move and keeps the moved picture. **Quit** leaves ppic move and restores the original picture.

Bkgd A	Create a series of ***mosaic*** images from a 20-K ppic. Use with **Bkgd C** and **Effct A** to create an animation.
Bkgd D (option)	***Digitize*** a black and white video signal, and convert it into a 20-K ppic. This ppic will be recorded on the disk and can be used to create a custom font. See "20-K Options, The Dubner K-series Video Digitizer," for details.
Bkgd E	***Edge*** the current foreground and/or ppic, creating a new ppic. Use this command to experiment with different edge combinations without having to create a whole new font. **Bkgd E** uses the edge and shadow color of the current Selector. See **Font E** for a description of edging choices.
Bkgd P (option)	Enter K-Paint. See K-Paint User's Manual.
Bkgd G	***Magmove*** combines text messages and/or ppics into an animation or into intermediate frames that make up an animation. To see examples of the various motions, press **Seq-Play Read** `magmove` **Enter Enter.**

Magmove applies a series of `xform` transformations (see the Do command `xform` in Section 11.4 and see below) to one or more messages, resulting in a series of ppics that you can then combine and animate. There are two levels of Magmove: full 3-D motion for systems with the K-Paint or K-series Digitizer option; move, scale and spin for systems without those options.

Bkgd G can combine several text messages and/or ppics.

Two pages are needed on the status monitor to prepare for Magmove. When the first page is completed, **Enter** brings up the second page. The following are the prompts for Page 1 of the Magmove menu:

`First message name`. (required) Magmove does *not modify* the message currently on the screen. If only the first message name is specified, Magmove uses that image in every output frame, allowing you to move the image around.

`Last message name`. (not required) Magmove uses the messages between the first and last name in successive frames. This allows you to create successive pictures of a horse, for example, and then make him gallop around in space.

`Record what?` Use **Prev** or **Next** to select `Resulting animation` or `ppics only`.

`Resulting animation:` Magmove records the individual frames at "MMstill1," "MMstill2," etc.; combines them when the series is complete; and records them at `Record name`.

`ppics only:` Magmove records a series of ppics starting at `Record name`.

`Record name.` (required)

`Alt output drive.` If you have extra disk drives, you can record the output on an alternate drive.

`Number of frames.` You can enter the number of frames required. There are 30 frames in one second of animation.

`Preview frame #`. Magmove will only do that transformation without disturbing the rest of the Magmove to allow you to look at an individual frame before computing the whole sequence.

`Filter`. The filter corresponds to `xform`. The default is a nonojag filter; the nojag filter is somewhat smoother, but may run out of colors.

Press **Enter** to go to Page 2 of the Magmove menu:

Page 2 of the Magmove menu describes the `Initial` and `Final` keyframes. The first frame will be rendered at the initial position and the last will be rendered at the final position. As many intermediate frames as you specified will be created in-between the keyframes. The final output will be the intermediate frames plus the initial and final keyframe.

`Motion`. The default is `Constant`. Magmove performs linear interpolations between the keyframes. The other

Motion parameters are:

```
Accelerate
Decelerate
Acc/Decelerate
```

Press **Seq** **Read** `magmove` **Enter** **Enter** to see examples of the various motions.

`X,Y,Z Position`. Specified in dots (for X) and lines (for Y and Z) the same way they are specified for `xform`.

NOTE: Scaling is specified differently in `xform`. Magmove uses a scale of 0 - 100%, not 0 - 1.0.

If you ask for s=200 in xform, thinking of 200%, you will get one huge dot at magnification 200X.

`Z Rotation`. Specified in degrees (positive is clockwise).

`X,Y Rotation`. Moves the origin of rotation. Requires the K-series Digitizer or K-Paint option.

As you use Magmove, keep ideas for reasonable improvements in mind. For instance, we should be able to save these as messages, copy the final to initial position (and vice versa) for multiple keyframes, and save where the Magmove is so it can be restarted. Suggestions short of an animation editor will be appreciated.

Do `xform` moves, scales and rotates a message. `xform` operates on whatever message is *currently* on the color monitor. It will weave the foreground text onto a ppic as needed. Press **Do**, then type `xform`. (If you forget the parameters, press **Help**. The status monitor will display the parameters.) Enter the transformation parameters and press **Enter**. `xform` transforms the ppic, leaving it on-air ready to be recorded.

`xform` uses a left-handed coordinate system centered at the center of the screen:

positive X is right
positive Y is up
positive Z is back into the screen

X positions are expressed in dots, Y and Z in scan lines. Experiment to see what various combinations of `xform` parameters do to the ppic. The "eye" of an imaginary viewer looking at the perspective transform is initially positioned at minus two screen heights from the monitor tube face.

xform mx=100 sy=.5	Moves the ppic 100 dots to the right and makes it half as tall.
xform s=2 rz=45	Makes the ppic twice as big and rotates it 45 degrees clockwise.
xform rx=-45 ry=90	Turns the picture on its ear. Note that true rotation in 3-space requires divides and hence is slower.

The default is a nonojag filter. Dots are copied from the source message to the output ppic without filtering. The nonojag filter suffers from artifacts, the most annoying being drop-out as the picture gets smaller (certain features just disappear).

The nojag filter averages four adjacent source dots together to create each output dot. The result is a smoother looking picture. Unfortunately, this sometimes produces too many colors.

9. FONTS

9.1 20-K Fonts

The 20-K types two kinds of fonts, standard and anti-aliased. The standard font resolution is 40ns. While this is very good by traditional character generator standards, the fonts exhibit the aliasing artifacts, or "jaggies"; typical of computer generated displays.

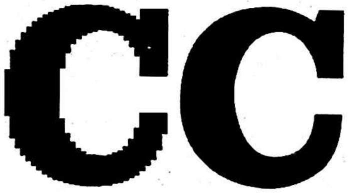


Figure 9: Standard and Anti-aliased Fonts

Ordinarily, standard fonts are satisfactory. For you who require greater resolution, we have an optional anti-aliasing package. Additional anti-aliased fonts from a vast library of typefaces are available.

The 20-K comes with one anti-aliased master font, "Swiss 742 Bold," six standard fonts in four sizes and "Bonus Fonts." The standard fonts come in four sizes: 56, 36, 24, 16.

Swiss 742 Bold
Freeform 741 Bitstream Cooper Bold
Swiss 721 in four additional sizes
Monospace 800 Prestige 12/Pitch Text
Latin 725 Medium

Bonus Fonts are special purpose fonts ready for use. They are:

Brush Gold
Diagonal Font Swiss 721 Medium tilted 29 degrees
Boxfill/Graphics
Freeform 741 Bitsream Cooper Bold 36 with 3-D drop shadow
Freeform 741 Bitstream Cooper Bold 56 Embossed
Freeform 741 Bitstream Cooper Bold 36 True
Windsor 40 Multicolored
Bullet Fonts for use with Presentation Graphics

Anti-aliased fonts coexist with the standard fonts that come with the 20-K. Anti-aliased fonts use the machine's hardware resources (memory, available colors, etc.) differently from the standard fonts.

Here are the tradeoffs:

Resolution. The standard font resolution is 40ns. Anti-aliased font use digital filtering techniques to eliminate the jaggies. The effective resolution of the resulting displays is better than 10ns.

Colors. The 20-K can display 256 colors simultaneously out of a palette of 16.7 million colors. With the standard fonts this is more than enough for almost any display. Anti-aliased fonts, however, use many extra colors for intermediate shades. For instance when the foreground, edge and drop shadow colors are all different, as many as 96 colors can be used. Typically, 32 colors are actually used per Selector, allowing eight different combinations per display.

Font Size. Standard fonts use 10,000 - 60,000 bytes per font. Anti-aliased fonts are about four to six times larger.

Flash. Standard characters can flash foreground, edge and shadow independently. Anti-aliased characters flash the entire character together.

Anti-aliased fonts come in two formats: master font format and fixed size. While a master font cannot be typed directly, it can be scaled to any size. See **Font A.** The fixed size fonts are ready to be used immediately. They can be re-edged with **Font E.**

To make a font for the 20-K:

1. Scale a master font to the desired size
2. If you like, add an edge and shadow

The K program `MAKEFONTS`, found on the Distribution Disk, automatically scales and edges multiple master fonts.

Optional master font groups AA-1 through AA-4 contain 16 fonts. These may be purchased from your Dubner distributor. Individual fonts are also available; call your Grass Valley representative for details.

Optional fonts, purchased individually, are locked to individual machines. Anti-aliased fonts purchased as part of a package may be moved freely among 20-K's that have also purchased that package. If you own multiple machines, and wish to transfer optional fonts among them, contact Dubner.

You can read text displays created with optional fonts and reposition their characters, but you can't type new text unless you've purchased the font option for the machine.

9.2 Font Numbering

As you will discover in the next section, when you scale or edge a font with **Font A** and **Font E**, you can "name" the new font with any number you like. This gets confusing if you don't have an organized scheme for numbering your fonts. Here's what we suggest:

1. Master fonts are numbered 60001-60032. Font 60001 is Clarendon Light; we call this "font style 1." Font 60002 is font style 2, and so on.

2. Whenever we scale a font, we assign it a 4-digit font number. The first two digits are the font style (01-32) and the last two digits are the height in scan lines (01-99). For example, font 1624 is style 16 (Century Bold) scaled to 24 lines high, and font 3112 is style 31 (Brush Script) in size 12.

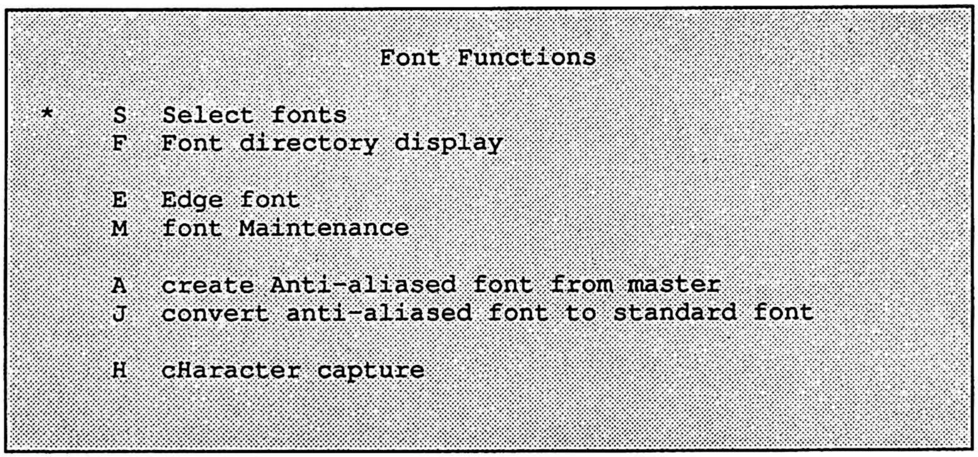
3. The K program `MAKEFONTS` automatically numbers the fonts it makes according to this scheme. `MAKEFONTS` simply asks you for one or more style numbers, and one or more sizes, then goes about its business. Fonts are scaled, then given a two-line edge and four-line drop shadow.

You don't have to follow our numbering scheme, but we strongly recommend it. Especially if you regularly convert text messages between Dubner machines.

Our font numbering scheme can't handle fonts bigger than 99 scan lines, or multiple edge types of the same size font. In those cases, you'll have to devise your own numbering scheme.

9.3 Scaling Fonts

Press **Font** to get this menu:



```
                    Font Functions

  *     S   Select fonts
        F   Font directory display

        E   Edge font
        M   font Maintenance

        A   create Anti-aliased font from master
        J   convert anti-aliased font to standard font

        H   cHaracter capture
```

Menu 14: Font Functions

Use **Font A** to make an anti-aliased font of any size. (Or, better yet, use **Do** `MAKEFONTS` **Enter.** See the previous section.)

You can create an anti-aliased font from:

- a master font
- a standard font
- an existing anti-aliased font

Normally, use a master font to create an anti-aliased font. If no master font is available, use an existing anti-aliased or standard font (but be forewarned that the results may not be as good).

The 20-K allows you to scale a master font to any size. However, we don't recommend that you create fonts larger than 150 scan lines; for larger sizes, the anti-aliasing quality is not guaranteed.

It takes a few minutes to create an anti-aliased font. After the font is created, you may edge it with **Font E**.

Font A menu items:

`Master font number`. Enter the master font number and comment.

`New font number`. Enter the new font number and comment.

`Height`. Specify height of upper case letters, in scan lines.

`Horizontal scaling %`. Specify a percentage between 10 and 999. The default is 100%. Use this option to create expanded and condensed font styles. A small percentage creates a skinny font; a large percentage creates a fat font.

`Filter Type`. The default filter type is `narrow (gauss)`. This filter produces sharp looking characters. The `wide (gauss)` filter creates smoother characters. In most cases, gauss filters give better results. For those special cases where the font looks better with the `narrow` or `wide` filter, we provide them also. Make your choice depending on your own application.

`Machine`. Fonts can be scaled for other Dubner equipment, including the DPS-1, CBG/Texta, the other K-series, PAL machines, etc. Use **Prev** and **Next** to scroll through the various possibilities.

`International Character Set-> Yes/No`. Master fonts include international language characters and accent marks. You can exclude these characters so that your scaled font uses about 25% less disk space.

9.4 Edging a Font

Press **Font E** to edge a 20-K font. **Font E** takes an existing 20-K anti-aliased or standard font, and creates a new font with the specified edge and shadow. If the font was edged previously, the new edge and shadow replaces the old ones. The status monitor shows you the original edge and shadow values (if any).

You can also edge the current foreground text and/or ppic display. This is a quick way to try different edges and shadows with having to edge an entire font. Press **Bkgd E** (Section 8.1).

There are three basic styles of edge: edge/shadow, 3-D and embossed.

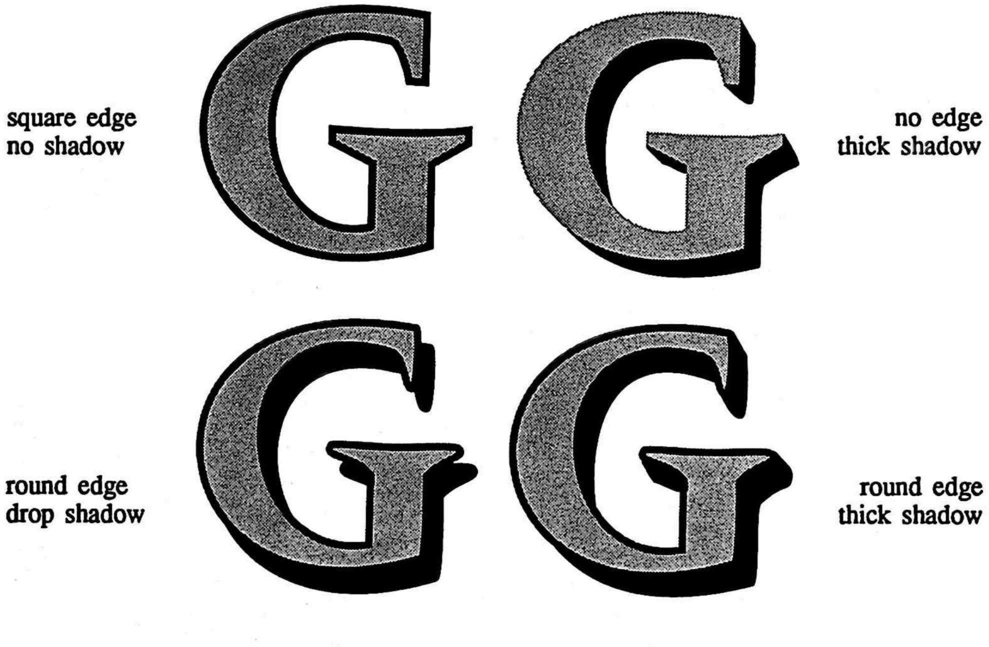


Figure 10: Edge/shadow

Edge/shadow is the normal choice for most situations. This creates an edge and shadow for each character in the font. For the edge, choose a height (2 or 4 scan lines is typical) and a shape (`round` or `square`). For the shadow, choose a direction to cast the shadow (`North,` `Northeast,` etc.), a shadow shape (`drop` for a single drop shadow, `thick` for a solid "shadow"), and an offset for the shadow (for `thick` shadows, the "offset" sets the thickness).

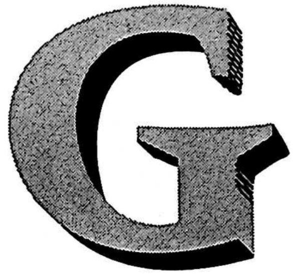


Figure 11: 3-D Edge

3-dimensional edge extrudes the characters so that they have depth. The "shadow" color is used for the bottom of the extrusion and the "edge" color is used for the sides.

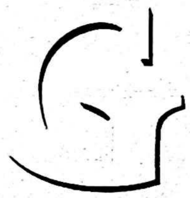


Figure 12: Emboss

Emboss creates two drop shadows in opposite directions. For the best results, set the edge color to a light color and the shadow color to a dark color (or vice versa). Then turn off the foreground color (see Section 5.2).

The edge and shadow are a physical part of every character in a font. Although you can turn the edge and shadow off in palette mode, they still take up room when determining the spacing between rows. If you do not want to use an edge or shadow with a particular font, "unedge" it by setting the edge height and shadow offset to 0. Unedged fonts type faster and take up less disk (and screen) space.

9.5 Other Font Functions

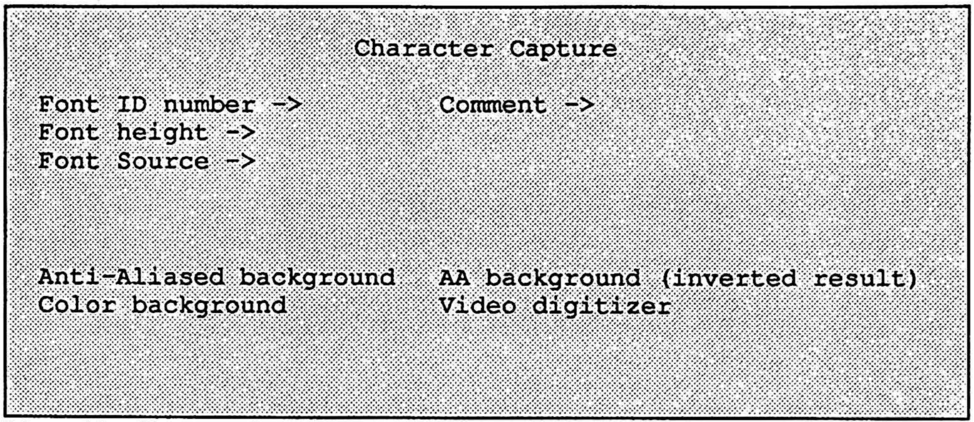
Font J	Convert an anti-aliased font to a standard (jaggy) font of the same size. This command is intended for users of other Dubner K-series character generators, to preserve compatibility among machines. Or, since standard fonts use less colors than anti-aliased fonts, they can be typed over many-colored backgrounds in cases where anti-aliased fonts run out of colors.
Font M	***Font maintenance.*** Allows you to set the width of the space character and digits 0-9, set the kern amount, and adjust the row size for the specified font. Edge type and font size are also displayed on the status monitor, but cannot be changed with **Font M**. *CAUTION*: The new values do not affect text that has already been typed or recorded.

9.6 Create a Custom Font

You can create your own custom font with the 20-K's ***Character Capture*** feature, from any ppic made on the 20-K or copied from another Dubner machine. You can also capture a font using the optional K-series Digitizer. See "20-K Options, K-series Video Digitizer."

To capture a character from a ppic, read in that ppic. Make all of the ppics (except the area to be captured) one solid color or screen color (unless you are making a color logo).

Then press **Font H** to display the Character Capture menu:



```
                    Character Capture

 Font ID number ->           Comment ->
 Font height ->
 Font Source ->



 Anti-Aliased background     AA background (inverted result)
 Color background            Video digitizer
```

Menu 15: Character Capture

Enter the new number for the font you want to create, a comment (optional), and the height of the font. The height of a font is the number of scan lines between the top and bottom of the font's upper case "H."

If you want to add characters to an existing font, or if you want to overwrite an existing font, leave the comment and height alone; the 20-K will fill them in for you. If you choose an existing font number, you'll be given the choice to add new characters to the existing font, or destroy and overwrite the entire font, or pick a new font number. *BE CAREFUL! Make a backup copy of the original font before proceeding.*

Move the cursor to `Font source` then press **Prev** or **Next** to display the source choices:

- anti-aliased background
- anti-aliased background (for inverted characters)
- color background
- video Digitizer

`Font source -> Anti-aliased background`. Creates unedged anti-aliased characters. This is the normal way to create a custom 20-K font. (Later, you'll be able to assign colors in Palette mode, and edge the characters with **Font E.**)

`Font Source -> AA background (inverted result)`. Creates unedged anti-aliased *transparent* characters. The rest of the box (in which the character lives) is made opaque. The palette treats the transparent area as if it were the screen color and the opaque surrounding area as the foreground. Use this option to create transparent characters, which can then be woven onto a background to create "textured" letters.

`Font Source -> Color background`. Creates ***preset-color characters.*** Choose this option if the source background contains multi-colored foreground objects on a background. These captured characters will have the same colors as the original background. Preset-color characters have "fixed" colors; you can't change them in **Pal** mode. You can't scale or add edges and drop shadows to preset-color characters.

`Font Source-> Video Digitizer` (Option). See, "20-K Options, The K-series Video Digitizer."

Press **Enter** to start Character Capture. You will see three horizontal and two vertical lines on the 20-K screen:

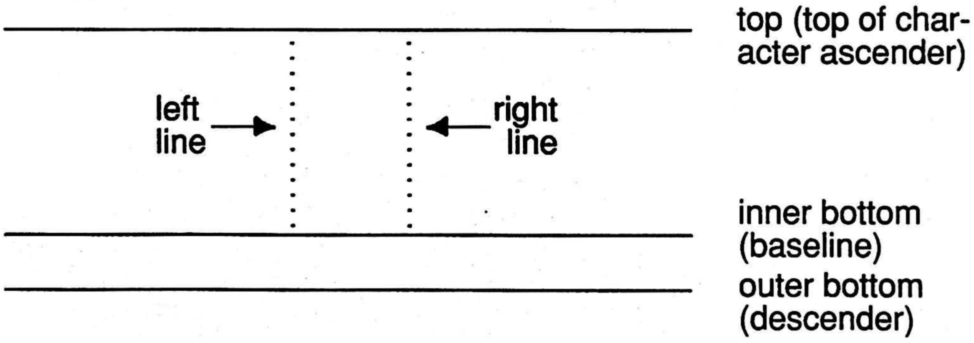


Figure 13: Character Capture Guidelines

Enclose the character within the guidelines, moving the lines until the base of the character rests on the inner bottom line. This line represents the ***baseline*** of the font, which is used to align this font with others on the same row. Some characters, such as "g," may extend below the baseline but within the outer bottom line. Ascenders such as the apostrophe, must fall within the top line.

The following keystrokes move the guidelines:

[↑] [↓]	Move all the horizontal lines up, down.
[←] [→]	Move both vertical lines left, right.
Shift-Char [↑] [↓]	Move the top line up, down.
Shift-Row [↑] [↓]	Move the outer bottom row up, down.
Shift-Char [←] [→]	Move the left vertical line left, right.
Shift-Row [←] [→]	Move the right vertical line left, right.
Insrt	Return the box to the original position.
Compose	Return to Compose mode.

The numbers at the bottom of the status monitor indicate the position of the top, outer bottom, left and right lines, as well as the height and width of the box they form. Only those parts of the character that fall within the top, outer bottom, left and right lines, are captured. The software ignores the blank spaces above and below the character.

When you're satisfied that the character is properly enclosed, type the key on the 20-K that you will use for that character. For example, for an upper case "A", type, **A**. The 20-K displays the character.

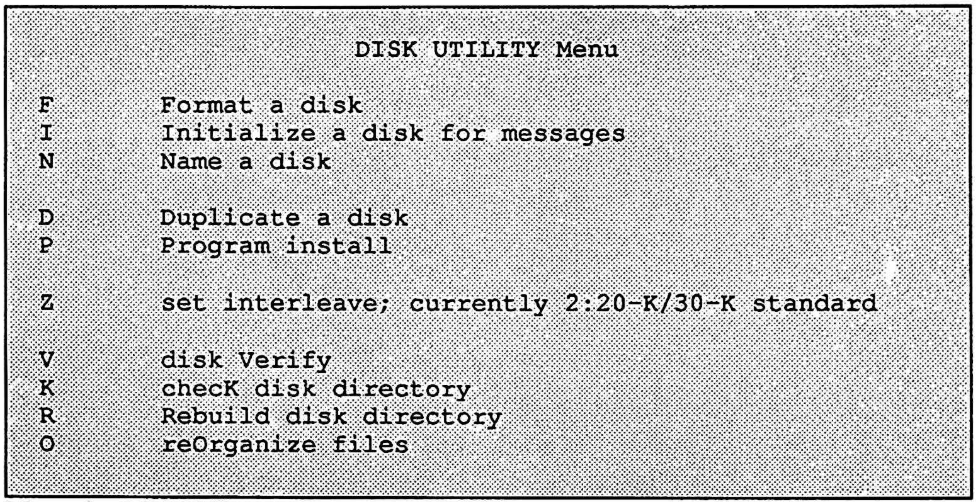
Home	to readjust the lines and try again.
Enter	records the character in the font. Repeat to capture all the characters.
Compose	ends Character Capture and returns to Compose mode.

To add more characters to the same font, or to recapture an existing character, enter the Character Capture menu and specify the same font ID number.

10. UTILITY FUNCTIONS

10.1 Disk Utility Functions

Press **Disk-Util** to bring up this menu:



```
                    DISK UTILITY Menu

  F       Format a disk
  I       Initialize a disk for messages
  N       Name a disk

  D       Duplicate a disk
  P       Program install

  Z       set interleave; currently 2:20-K/30-K standard

  V       disk Verify
  K       checK disk directory
  R       Rebuild disk directory
  O       reOrganize files
```

Menu 1: Disk Utility

The disk utility functions are:

Disk-Util F *Format a disk.* Before you can use a new disk in the 20-K, you must first format it. Or, if you are getting many disk errors on a disk, format it to clear out the errors. *WARNING: Formatting a disk completely and irreversibly destroys any information on it.* It takes a about two minutes to format a 10 megabyte disk; about 10 minutes to format a 20 megabyte disk.

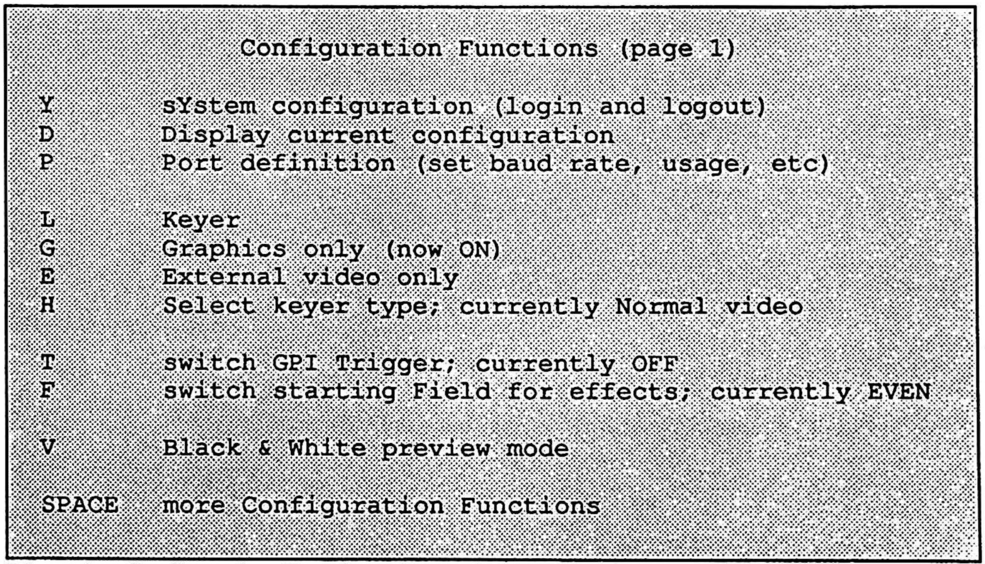
After you format a disk, initialize it with **Disk-Util I,** or use it to make a backup copy of another disk with **Disk-Util D.**

Disk-Util I	*Initialize* a disk for messages. This command creates an empty directory on your disk with no fonts or messages. Use this command to reuse an old disk (destroying all messages and fonts on it), or to start using a newly formatted disk. The status monitor asks if you wish to install the program on the new disk, too.
Disk-Util N	*Name* a disk. The name can have up to 31 characters. This name is displayed on the status monitor during directory displays and on the Compose status monitor screen.
Disk-Util D	*Duplicate* a disk. Copy the entire contents of a disk onto another disk. The two disks will have identical contents, i.e., have the same program, fonts, and messages and logout data.
Disk-Util P	*Install a new program.* When you receive a software update from Dubner, use this command to install the new software on your old disks. Existing fonts or messages will not be affected. Make sure the most recent program version is installed on all your disks. Save one copy of the old working program, just in case.
Disk-Util Z	*Set the Iomega interleave* for the **Disk-Util F** (format), **Disk-Util I** (initialize), and **Disk-Util D** (duplicate) commands. The interleave controls the disk's data transfer rate. Different Dubner products require different interleave settings. Interleave 1: GF/DPS-1/10-K. *WARNING:* Interleave 1 disks read very slowly on the 20-K. Interleave 2: 20-K/30-K standard. This is the normal 20-K interleave, permitting the highest data transfer rate. This is the 20-K's factory default. Interleave 4: 20-K/30-K Quantized. This is rare; use interleave 4 only if you have a 30-K and you use a lot of complicated quantized pictures. If quantized pictures take too long to read on your 20-K (say, 4-20 seconds instead of 1 or 2 seconds), set the disk interleave to 4. This forces the read to take four seconds no matter what. Save the interleave setting permanently with **Confg Y S**.

Disk-Util V	*Verify the disk.* Read back the blocks on the disk to check for errors. List any errors that are found.
Disk-Util K	*Check the integrity* of the directory on the selected disk. Use this command if you're getting errors when reading or recording.
Disk-Util R	*Rebuild* a damaged directory on the selected disk. If you accidently initialize a disk or have disk read errors, you can sometimes recover the old fonts and messages with this command. If you accidentally format a disk, the messages are gone forever.
Disk-Util O	*Reorganize* the files on the selected disk for the most efficient use of disk space. This function may increase the amount of contiguous free space on your disk, if free space has become fragmented after many records and deletes. Message copy (**Dir C**) to a different disk has the same effect (on the new disk).

10.2 Configuring the 20-K

Here we group all the little things needed to customize the 20-K to your particular installation. Press **Confg** to bring up the following menu:



```
                 Configuration Functions (page 1)

Y        sYstem configuration (login and logout)
D        Display current configuration
P        Port definition (set baud rate, usage, etc)

L        Keyer
G        Graphics only (now ON)
E        External video only
H        Select keyer type; currently Normal video

T        switch GPI Trigger; currently OFF
F        switch starting Field for effects; currently EVEN

V        Black & White preview mode

SPACE    more Configuration Functions
```

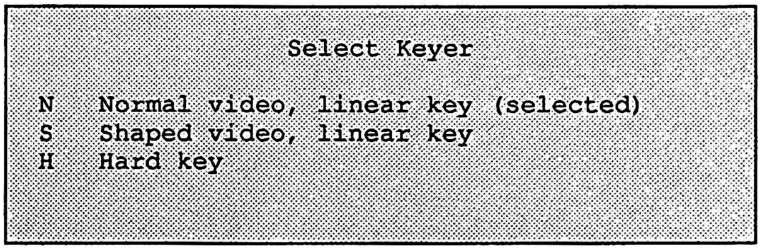
Menu 2: Configuration Functions (Page 1)

Confg L *Enable Keyer.* Enable the built-in downstream Keyer so you see 20-K graphics keyed over external video. To disable the keyer, use **Confg G** or **Confg E**.

Confg G *Graphics only.* Forces the key signal to be always high, so that you see all 20-K graphics and no background video.

Confg E *External video only.* Forces the key signal to be always low, so that you see only external video.

Confg H *Select Linear Key type.* If you are using the 20-K with an external switcher, it is important to use the right type of key signal for proper anti-aliasing. A sub-menu shows you the three possibilities:



```
                Select Keyer

 N   Normal video, linear key (selected)
 S   Shaped video, linear key
 H   Hard key
```

Menu 3: Select Keyer Type

Normal Video: Normally, the 20-K produces a "spread" linear key signal. This is the default setting and is recommended for GVG and Ampex switchers.

Shaped Video: Some switchers require "shaped" video for a proper linear key. Shaped video attenuates the video signal by multiplying it times the key signal. Screen color (transparent) is always black when you use shaped video. If your switcher requires shaped video, choose this setting.

Hard key: If your keyer or switcher doesn't use linear keying, first try setting the clip point to 50%. If that doesn't work properly, select hard key to force the 20-K's key signal to be hard. *WARNING:* Using a hard key signal with anti-aliased graphics can produce undesirable keyer artifacts at the edges of font characters.

Confg T

GPI (General Peripheral Interface) Trigger on/off. When the GPI trigger is on, the only way to start a 20-K effect is by ***triggering*** it. Trigger an effect by either

- pressing **Home** or **Enter**
- shorting pins 4 and 5 of Serial port D
  (pin 4 is normally grounded)

CAUTION: **Confg T** has no effect on `TRIG` in the <u>`WAIT`</u> column of a sequence.

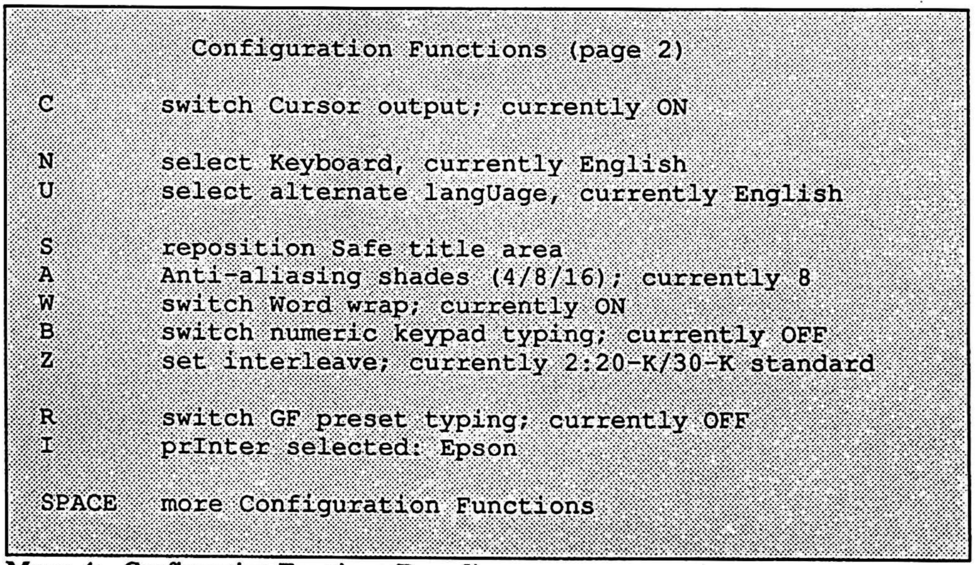
Confg F

Start effects on even/odd field. The 20-K always begins effects and animations on the same field. This command lets you pick which field to start with, even or odd.

Confg V

Switch Preview mode. In Preview, the status monitor functions as a *preset* channel. The *program* channel is frozen. Message recall and text editing takes place on the black and white status monitor. Press **Enter** to transfer preset displays immediately to the program output, or use an Effect.

Press **Confg** then **Spacebar** to see page 2 of the Configurations menu.



```
             Configuration Functions (page 2)

  C        switch Cursor output; currently ON

  N        select Keyboard, currently English
  U        select alternate langUage, currently English

  S        reposition Safe title area
  A        Anti-aliasing shades (4/8/16); currently 8
  W        switch Word wrap; currently ON
  B        switch numeric keypad typing; currently OFF
  Z        set interleave; currently 2:20-K/30-K standard

  R        switch GF preset typing; currently OFF
  I        prInter selected: Epson

  SPACE    more Configuration Functions
```

Menu 4: Configuration Functions (Page 2)

Confg C

Cursor on/off. Normally, the cursor is on, and you can see it (along with the safe title lines) on your cursor monitor. When the cursor is turned off, the cursor output is identical to the program (line) output.

Confg N, U

Select keyboard language and ***alternate language.*** Press **Next** or **Prev** (or type the appropriate letter) to select the keyboard language and alternate language.

The status monitor displays the current keyboard layout. The top line of the keyboard layout shows the alternate language characters. To type one of these characters, press **Alt** followed by a number **0-9.**

Confg S

Reposition safe title area. The safe title area usually defines the middle 80% percent of the video screen, leaving 10% on all sides. It also sets the center of the screen for the centering functions. You can adjust all four parameters independently. After you reposition the safe title area, use **Confg Y S** to save the new position.

Confg A

Anti-alias with 4, 8 or ***16 shades.*** This command changes the number of intermediate levels used for anti-aliasing. While most users will want to leave this level set to its default value of 8 shades, **Confg A** may be used to change the number of colors used for blending anti-aliased characters, i.e. to change the apparent resolution of characters. Here are the issues and tradeoffs involved:

The ***actual resolution*** of a character generator can be defined as the time it takes to display a single pixel. For the 20-K, that's about 40 nanoseconds. Some manufacturers speak of ***apparent resolution,*** which they define as

apparent resolution = actual resolution / intermediate shades

In other words, a character generator with 40ns pixels and four shades of anti-aliasing has an apparent resolution of 20ns. A system with the same size pixels but eight intermediate shades has an apparent resolution of 10ns, and one with sixteen shades has an apparent resolution of 5ns.

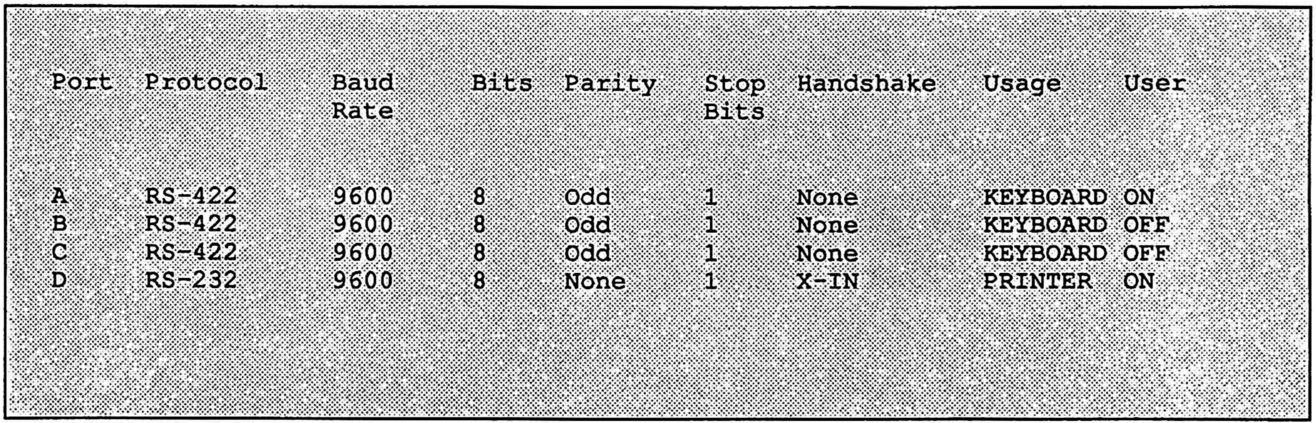
Confg W

Word wrap on/off. When word wrap is on, and you type a word beyond the safe title area, the word is automatically moved down to the next row.

Confg B	***Numeric keypad typing on/off.*** When numeric keypad typing is on, the numeric keypad (the "counter") works exactly like the numbers across the top of the typewriter keyboard. When numeric keypad typing is off, the numeric keypad is only active for entering effect speeds, message names, and filling in or choosing menu entries.
Confg Z	***Set Iomega interleave.*** See **Disk-Util Z**.
Confg R	***GF preset typing.*** Default is OFF. Turn ON for Graphics Factory preset-color fonts created prior to Graphics Factory Program version 2.4. It is automatic for fonts created with versions 2.4 or later. Turn OFF for K-series or GF 2.4 or later, preset color fonts.
Confg I	***Select Printer.*** Toggles between the Epson and the Texas Instrument printers.

10.4 Configuring the Serial Ports

The 20-K has four serial ports, which can be connected to keyboards, modems, external computers, switchers, etc. See Appendix C for cable diagrams. This command sets the physical characteristics of the I/O ports, and describes how each port is used. **Confg P** brings up this display:



```
Port  Protocol   Baud     Bits  Parity   Stop  Handshake   Usage     User
                 Rate                    Bits

A     RS-422     9600     8     Odd      1     None        KEYBOARD  ON
B     RS-422     9600     8     Odd      1     None        KEYBOARD  OFF
C     RS-422     9600     8     Odd      1     None        KEYBOARD  OFF
D     RS-232     9600     8     None     1     X-IN        PRINTER   ON
```

Menu 5: Port Definition

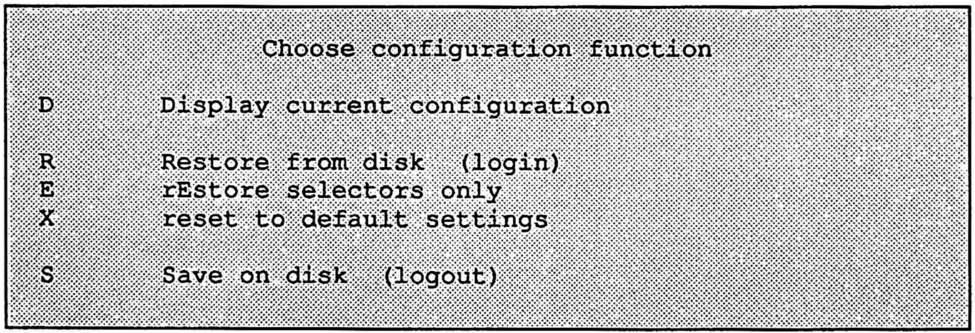
Port A is protected. You can't change the choices for Port A. You can change the parameters of Ports B, C and D. Use the arrows keys to move around the screen; use **Next** and **Prev** to scroll though the choices for each column. Port `Usage` is one of the following:

`KEYBOARD`	Up to four keyboards can be connected at one time. `Parity` for the 20-K keyboard should be `Odd`.
`HOST`	*External computer.* Use an external computer to control the 20-K, by "typing" 20-K keystrokes. See also Section 10.6.
`EMEM0, EMEM1, ..., EMEM7`	*EMEM address.* Assign the 20-K to a GVG Switcher EMEM address, 0 through 7. When the 20-K is in Compose mode, and the switcher issues a "learn" command, the 20-K transmits to the switcher the name of the last message recalled, or the last sequence executed. Later, when the EMEM sequence is played back on the switcher, the 20-K recalls that message or sequence. **Misc G** displays a list of the messages that have been learned by the switcher.
`DATA I/O`	*Data Transfer.* Transfer text, animations, pictures, and fonts to/from other Dubner machines. See Section 6.7, **Dir O** and **Dir I**.
`PEGS`	*Editor Interface.* A GVG Editor equipped with "Super Edit Version 2.0" can control the 20-K. The PEGS dialogue (developed for the CBG and Texta) is used to recall text pages, ppics, and sequences. The PEGS "T" command instructs the 20-K to display a message whose name is between 9001 and 9999, where the last three digits of the message name are the value of the PEGS register. When the PEGS register value is 000, the "T" command acts like a GPI trigger.
`PRINTER`	*Dot matrix printer.* Configure the port `Protocol` to be `RS-232`, Usage to `PRINTER` and `Handshake` to `X-IN`. Be sure the Baud rate of the 20-K port and the printer match. See Section 6.7.
`DIGITIZE`	*Digitizer* (option). For use with the K-series Digitizer. See "20-K Options, K-series Video Digitizer."

`PAD`	***Bitpad*** (option). For use with the K-Paint Pad (Tablet). See the K-Paint User's Guide.
`ELEC`	***Election System*** (option). For use with the Election system.
`WEATHER`	***Weather System*** (option). For use with the Weather system.

10.5 Saving the Configurations

When you change the 20-K's configurations, the changes are not permanent unless you save them on the disk. We call this process, "logout." Press **Confg Y** to bring up this menu:



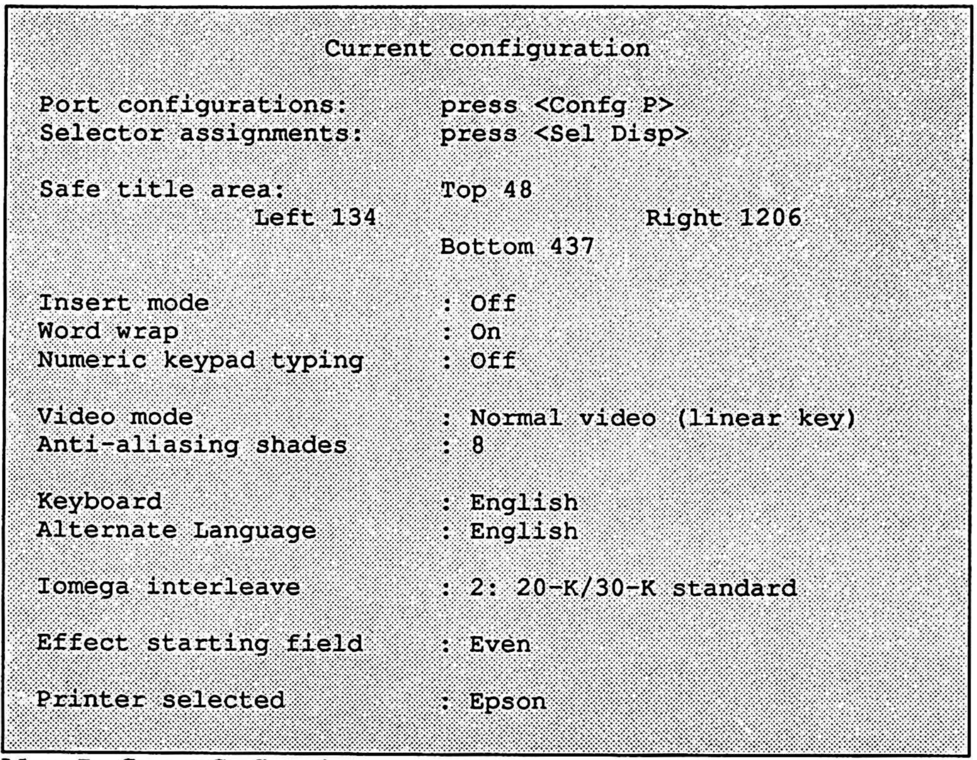
```
                 Choose configuration function

 D        Display current configuration

 R        Restore from disk  (login)
 E        rEstore selectors only
 X        reset to default settings

 S        Save on disk  (logout)
```

Menu 6: System Configuration

Confg Y R	***Reset.*** Reset the configuration to the last saved version from the selected message disk.
Confg Y E	***Partial login.*** Restore just the Selector settings.
Confg Y X	***Factory default.*** Resets the 20-K's configuration to the factory's defaults.
Confg Y S	***Logout.*** Save the current configuration on the selected message disk.

The configuration save and restore functions are:

Confg Y D ***Display the current configuration.*** These are the logout parameters.



```
                    Current configuration

 Port configurations:      press <Confg P>
 Selector assignments:     press <Sel Disp>

 Safe title area:          Top 48
               Left 134                Right 1206
                           Bottom 437

 Insert mode               : Off
 Word wrap                 : On
 Numeric keypad typing     : Off

 Video mode                : Normal video (linear key)
 Anti-aliasing shades      : 8

 Keyboard                  : English
 Alternate Language        : English

 Iomega interleave         : 2: 20-K/30-K standard

 Effect starting field     : Even

 Printer selected          : Epson
```

Menu 7: Current Configuration

10.6 Miscellaneous Functions

Press **Misc** to bring up this menu:

```
                    Miscellaneous Functions

D        Diagnostic programs
G        display Grass Valley Switcher EMEM knowledge
O        display Options

H        output string to Host
S        Send error code to host
C        Clear error code

P        Presentation graphics
B        run Background animation
```

Menu 8: Miscellaneous Functions

Misc D	***Hardware diagnostics.*** Display a menu of hardware diagnostic programs. Press **S Enter** for color bars. See the 20-K Technical Manual for a description of the hardware diagnostics.
Misc G	***Display Grass Valley switcher EMEM knowledge.*** The 20-K remembers the message names of the last twenty EMEM "learn" commands. This display shows the names of the messages that have been sent to the switcher. See **Confg P** to configure an EMEM port.
Misc O	***Display the options*** that have been enabled for your machine SIN (Software Identification Number). Current options include: K-series Video Digitizer, Presentation Graphics, K-Paint, Weather, Election, RGB Scanner, additional disk drives and additional font packages.
Misc H	***Send string.*** This command prompts for an ASCII string. When you press **Enter**, the string is sent out the serial port assigned to `HOST` usage. Use **Confg P** to configure a `HOST` port.

Misc S	*Send error code.* This command is useful when the 20-K is controlled by an external computer. The most recent error condition is sent out the `HOST` serial port as a single binary byte. Reported error conditions are: 0 No error 1 Font not found during message read 2 Character not in font 3 Message not found 4 Disk error during message read
Misc C	*Clear error code.* This command is used with **Misc S**. Send this command from an external computer whenever you start a remote callup.
Misc P	*Presentation Graphics* (optional). See Presentation Graphics user's manual.
Misc B	*Background animation.* From Preview mode, run an animation on the Program channel. You may still compose text, etc., on the status monitor. When you wish to stop the animation and pop on-air whatever is on the status monitor, use **Confg V.**
Misc W	*Weather* (optional). Enter the weather system.

11. DO COMMANDS

11.1 Do Commands

As you have seen, operating the 20-K means dealing with a lot of menus. Menus are nice—especially for beginners—because they show you all of the possible choices and because they are generally self-explanatory. However, for experienced operators with deadlines to meet, menus are often too slow. Which brings us to Do commands.

Do commands are another way to do 20-K functions. Many functions that you can do with a menu, you can also do with a Do command. If you know your commands, they're a lot faster to use than menus. You can also use Do commands in K Programs. (See 20-K Options, "Macros and K Programming Language.") To see a list of all the Do commands on the status monitor, press **Help Do.**

To enter a Do Command, first press **Do.** The ***Do command line*** appears on the bottom of the status monitor:

```
Type command, press <Enter>
->_
```

A Do command consists of a name followed by one or more ***parameters.*** The parameters define the action of the command, just as filling in the blanks of a menu does.

Using the typewriter keys, type the command's name, followed by its parameters. Separate the parameters from each other, and from the command name, with a space character. Don't type spaces within a single parameter. If you make a mistake, use [→], [←], **Insrt, Del, Backspace** or **Home** to correct it.

When you're satisfied that the command is typed correctly, press **Enter** to perform the command. Or, press **Compose** to change your mind. The 20-K doesn't actually execute a Do command until you press **Enter**, so you have plenty of time to back out, or start over.

Here's an example of a typical Do command, `select`. This command selects the current message and font drives:

```
Type command, press <Enter>
->select 1 2_
```

After typing `select 1 2` on the Do command line, press **Enter**. The 20-K selects 1-Iomega for messages, and 2-Iomega for fonts.

It's not easy to remember all of the parameters for every command, but fortunately, you don't have to. Each Do command has an on-line help screen that describes what the command does, and lists its parameters. To get help for a command, press **Do** and type the name of the command, then press **Help**. To scroll through additional pages of help, use **Next** and **Prev**.

11.2 Do Command Parameters

Do commands have three types of parameters:

- positional parameters
- flag parameters
- keyword parameters

A single command may have any combination of the three types, or no parameters at all. As an example, let's look at a command that has all three flavors of parameter, `delete`:

`delete` *drive* *firstmsg* `[`*lastmsg*`] [-ask] [-all] [type=]`

Positional Parameters. The parameters *drive, firstmsg* and *lastmsg* are ***positional parameters.*** They are called "positional" because they must occur in the correct order after the command name. In this User's Guide, we use italics to indicate positional parameters; on the status monitor, the help screens show positional parameters by indicating the position number.

When you type a positional parameter, don't type the word in italics; instead, type the value of the parameter, as if you were filling in a menu entry. For example,

```
delete  1  pict1  pict9
```

deletes messages `pict1` through `pict9` on 1-Iomega.

Some positional parameters are optional. In the User's Guide, we enclose optional parameters in brackets. In our `delete` example above, *lastmsg* is optional. We can omit it to delete a single message:

```
delete  1  pict1
```

Flag parameters. The parameters `-ask` and `-all` are ***flag parameters.*** Flag parameters have only two possible values, on or off. They are used to enable or disable a particular feature. The first character of a flag parameter is always a hyphen. After the hyphen, type either the name of the parameter (to turn the feature on), or `no` followed by the parameter name (to turn the feature off):

`-ask`	enables the "ask" feature
`-noask`	disables it

Flag parameters are always optional, so you'll always see them enclosed in brackets in the User's Guide. You can type flag parameters in any order, unlike positional parameters. If you omit a flag parameter, it reverts to its default value. The default value for each parameter is noted in the User's Guide and on the status monitor help screen.

The `-ask` parameter to the `delete` command turns prompting on and off. To enable prompting, type

```
delete  1  pict1  pict9  -ask
```

When prompting is enabled, `delete` stops and asks if the proper disk is inserted in 1-Iomega before it continues with the deletions. However, since `-ask` is the default value for this parameter, you needn't type it. Conversely, the command

```
delete  1  pict1  pict9  -noask
```

goes right ahead and does the deletions, without prompting.

Keyword Parameters. The optional parameter `[type=]` is a ***keyword parameter.*** A keyword parameter consists of a parameter name, an equals sign, and a value: `param=`*value*. Like flag parameters, keyword parameters are always optional and may appear in any order. A keyword parameter may or may not have a default value.

The *value* of a keyword parameter depends on the parameter. In the User's Guide, we use the following notation:

`param=`*num*

Numeric parameter. For example: `height=50`. Some commands allow decimal fractions `(height=12.34)` and others require integers `(height=12)`. You can also use arithmetic expressions `(height=(100/2)+3)`. If a command requires an integer parameter, the 20-K truncates the fractional part.

`param=`*string*

String parameter. A string is a sequence of alphabetic, numeric, and/or punctuation characters. If a string contains blanks, surround it with quotation marks. For example:

```
comment=Helvetica
comment="Helvetica Bold 22"
```

Remember to use quotations marks for message names.

`param=`*list*

List parameter. A *list* parameter restricts your choices to a specific list of strings. For example, the `style` parameter of the `fedge` command is described like this:

```
style=edgeshadow,3d,emboss
```

The only possibilities for this parameter are:

```
style=edgeshadow
style=3d
style=emboss
```

The default value of a list parameter, if any, is noted in the User's guide; on the status monitor help screens, the default parameter is preceded by an asterisk (*).

In our `delete` example above, `type` is a list parameter. To delete all the animations that start with the letter "A" on 1-Iomega, we could type:

```
delete  1  A  Az  type=anim
```

Drives and Message Types. Two kinds of *list* keyword parameters are used so frequently by the various Do commands that we will describe them here, rather than repeat them for each command.

The *drive* parameter names a particular disk drive. Depending on your 20-K's configuration, the possible values are:

VALUES FOR *drive*

1	1-Iomega	5	5-Wren
2	2-Iomega	6	6-Wren
3	3-Iomega	7	7-Floppy
4	4-Iomega		

The *msgtype* parameter is used by many commands to restrict their effect to a single type of message. The possible values are:

VALUES FOR *msgtype*

`all`	All types of messages, including fonts
`anim`	Animation messages
`font`	Fonts
`kpgm`	K programs
`msgs`	All types of messages, except fonts
`ppic`	Palette pictures
`sels`	Selectors
`seq`	Sequences
`tabs`	Tab stops
`text`	Text messages
`data`	Graph data (Presentation Graphics option)
`grph`	Graphs (Presentation Graphics option)
`slid`	Slides (Presentation Graphics option)
`pots`	Paint pot colors (K-Paint option)
`scan`	RGB Scanner image (Scanner option)
`wmap`	Weather text (Weather option)
`wpal`	Weather palettes (Weather option)
`wseq`	Weather sequences (Weather option)

11.3 Do Commands by Category

NOTE: We are hard at work documenting the remaining Do commands.

Here is a brief description of each of the 20-K Do commands, arranged by category:

Directory Commands

`comment`	Comment a message or font.
`copy`	Copy message(s) or font(s).
`delete`	Delete message(s) or font(s).
`dup`	Duplicate an entire Iomega disk.
`read`	Read a message from the selected message disk.
`rename`	Rename a message or font.
`select`	Select message and font disks.

Text Commands

`textdelete`	Delete the word under the cursor.
`textfind`	Find a string in on-screen text message.

Font Commands

`fedge`	Edge a font.
`fscale`	Create an anti-aliased font from a master.

ppic Commands

`combine`	Combine ppics into an animation sequence.
`edge`	Edge a ppic.
`mag`	Magnify a ppic.
`mosaic`	Turn a ppic into a ***mosaic*** of colored tiles. Create a series of ppics in which the tiles get progressively larger.
`move`	Move a ppic.
`rclock`	Run analog, digital clock(s).
`sclock`	Set the time of analog, digital clock(s).
`weave`	Weave a series of text and/or ppic messages.
`xform`	Transform a ppic.

Utility Commands

`install`	Install a new program.
`make_ntsc`	Change PAL program to NTSC.
`make_pal`	Change NTSC program to PAL.
`reboot`	Restart program; simulates pressing RESET button.

Input/Output Commands

`print`	Print files and directories.
`setport`	Configure a serial port.

Diagnostic Commands

`memtest`	Hardware Diagnostic: test 20-K memory.

Calculation Commands

`cos`	Return the cosine of the supplied angle.
`sin`	Return the sine of the supplied angle.
`sqrt`	Return the square root.
`tan`	Return the tangent of the supplied angle.

11.4 Do Commands in Alphabetical Order

Here are detailed descriptions of each command, in alphabetical order:

-> combine

Description:	Combine a series of text and/or ppics, and record the resulting animation message. The animation may be played back with **Effct A.**
Also see:	`weave`
Menu:	**Bgkd C**

```
combine firstmsg lastmsg animation [out=]
```

PARAMETER	DESCRIPTION	DEFAULT
firstmsg	First message to combine	—
lastmsg	Last message to combine	—
animation	Name of first animation message to record	—
`out=`*drive*	Record animation on a different message drive	Current message drive

Examples:

```
combine  forest1  forest20  firestorm
```

combines messages `forest1` through `forest20`, records the resulting animation at `firestorm`.

```
combine   pict1   pict9   flipspin   out=2
```

combines messages `pict1` through `pict9`, and records the resulting animation `flipspin` on 2-Iomega.

-> comment

Description:	Add a comment to a recorded message or font.
Also see:	`rename`
Menu:	**Dir N**

```
comment drive message comment [type=]
```

PARAMETER	DESCRIPTION	DEFAULT
drive	Drive where message is recorded	—
message	Message to be commented	—
comment	The comment for this message (up to 31 characters)	—
`type=`*msgtype*	Use `type=font` to comment a font	`type=msgs`

Examples:

```
comment  2  fred  "Mr. Flintstone at the beach"
```

adds a comment to the message `fred` on 2-Iomega.

```
comment  1  224  "Clarendon Bold 24" type=font
```

adds a comment to font 224 on 1-Iomega.

-> copy

Description:	Copy messages or fonts from one disk to another. Or, copy messages or fonts to the same disk and re-name them.
Also see:	`dup`
Menu:	**Dir C**

```
copy fromdrive todrive [firstmsg] [lastmsg] [newmsg] \
        [type=] [-noask]
```

PARAMETER	DESCRIPTION	DEFAULT
fromdrive	Where to read messages	—
todrive	Where to record the copies	—
firstmsg	First message to copy	—
lastmsg	Last message to copy	—
newmsg	New name to give *firstmsg*	—
`type=`*msgtype*	Copy only one type of message	—
`-noask`	Does not prompt for proper disk(s) to be inserted	`-ask`

Notes: If no message names are specified, `copy` copies every message on the *fromdrive* (of the specified type).

Examples:

```
copy  1  2
```

copies all messages on 1-Iomega to 2-Iomega. Prompts for insertion of proper disks.

```
copy  1  2  type=font
```

copies all fonts on 1-Iomega to 2-Iomega. Prompts for insertion of proper disks.

```
copy  1  2  fred  -noask
```

copies the message `fred` from 1-Iomega to 2-Iomega.

```
copy  1  2  pict1  pict99  -noask
```

copies messages `pict1` through `pict99` from 1-Iomega to 2-Iomega.

```
copy  1  1  pict1  pict99  frame1  -noask
```

copies `pict1` through `pict99` and renames them `frame1` through `frame99`, all on 1-Iomega.

-> cos

Description:	Returns the cosine of the supplied angle.
Also see:	`sin, sqrt, tan`
Menu:	

```
[$cos=]   cos   angle   [-d]
```

PARAMETER	DESCRIPTION	DEFAULT
angle	Angle (in degrees)	—
-d	Displays the results on the status monitor	-nod —

Examples:

```
$answer = cos   30   -d
```

sets the value of the K variable *$answer* to the cosine of 30 degrees and displays the result on the status monitor.

-> delete

Description: Delete pre-recorded messages or fonts from a disk.

Menu: **Dir D**

```
delete drive firstmsg [lastmsg] [-noask] [-all] [type=]
```

PARAMETER	DESCRIPTION	DEFAULT
drive	Drive where message(s) live	—
firstmsg	First message to delete	—
lastmsg	Last message to delete	*firstmsg*
`-noask`	Don't operator to press `y` before deleting	`-ask`
`-all`	Delete all messages of specified type	`-noall`
`type=`*msgtype*	Delete only one type of message	`type=msgs`

Examples:

```
delete 1 barney
```

asks for the operator to press Y, then deletes the message `barney` from 1-Iomega.

```
delete 1 -all type=font -noask
```

deletes all fonts from 1-Iomega.

-> dup

Description:	Duplicate the contents of an entire disk.
Also see:	`copy`
Menu:	**Disk-Util D**

```
dup fromdrive todrive [-noask] [-raw] [-skip]
```

PARAMETER	DESCRIPTION	DEFAULT
fromdrive	Disk to duplicate	—
todrive	Blank disk for copying to	—
`-noask`	Don't prompt for proper disks to be inserted	`-ask`
`-raw`	Do a raw duplicate (see Note 1)	`-noraw`
`-skip`	Skip errors on *fromdrive* (see Note 2)	`-noskip`

Note 1: The `dup` command does not duplicate unused sections of a disk. Use `-raw` to force `dup` to duplicate the entire disk, even the unused parts. (If you are trying to duplicate an MS-DOS or other non-20-K disk, the 20-K recognizes this and automatically does a raw duplicate.)

Note 2: If the `dup` aborts because your *fromdrive* disk has input errors, `-skip` will force the 20-K to duplicate the disk anyway. *WARNING:* This is not usually a good thing to do, since it may produce garbage data on your *todrive* disk. A better idea is to `copy` all the recoverable messages.

Examples:

```
dup 1 2
```

prompts for the proper disks to be inserted in both disk drives, then copies the entire contents of 1-Iomega onto 2-Iomega.

```
dup 1 2 -noask -skip
```

copies 1-Iomega to 2-Iomega, skipping any portions of 1-Iomega with read errors.

-> edge

Description:	Add an edge and/or a shadow to the current ppic, using the edge and shadow colors of the current Selector.
Also see:	`fedge`
Menu:	**Bkgd E**

```
edge [style=] [height=] [shape=] [offset=]\
     [direction=] [shadow=]
```

PARAMETER	DESCRIPTION	DEFAULT
`style=`*list*	Edge/Shadow style: `edgeshadow, 3d, emboss`	`style=edgeshadow`
`height=`*num*	For `edgeshadow` edge, specifies the thickness of the edge in scan lines. Does not apply to edge styles `3d` and `emboss`.	`height=2`
`shape=`*list*	Shape of `edgeshadow` edge: `round, square`	`shape=round`
`offset=`*num*	For `edgeshadow` edge, specifies shadow's offset. For `3d` or `emboss`, specifies depth.	`offset=4`

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`direction=`*list*		

	Direction of shadow:
	`NO, NE, E, SE, SO,`
	`SW, W, NW`
		`direction=SE`

`shadow=`*list*	For `edgeshadow` edge, specifies type of shadow: `[drop, thick]`. Does not apply to `3d` or `emboss`.	`shadow=drop`

Notes: See Chapter 9 for a complete description of the various edge and shadow combinations. Most operators prefer to use **Bkgd E**, since it's easier to use than the `edge` command.

Examples:

```
edge  style=edgeshadow
```

puts an `edge/shadow` edge on the current ppic, using the colors of the current selector. The `edge/shadow` edge is round and two scan lines high, and has a drop shadow displaced four scan lines down and the to right (`SE`).

```
edge  style=edgeshadow  height=8  offset=0
```

puts an 8-scan-line edge on the current ppic, with no shadow (`offset=0` eliminates the shadow).

```
edge  style=edgeshadow  height=0  offset=20 \
      direction=SO
```

puts a single drop shadow under the current ppic in the shadow color of the current Selector. This shadow is displaced 20 scan lines below ("south") the original ppic.

```
edge  style=edgeshadow  height=2  offset=10 \
      direction=NW  shadow=thick
```

edges the current ppic with a 2-scan-line edge, and adds a "thick" shadow that goes ten scan lines up and to the left.

```
edge  style=3d  offset=16  direction=SW
```

creates a 3-D edge on the current ppic, 16 lines thick, going down to the left.

```
edge  style=emboss  offset=4
```

Embosses the current ppic with a depth of four, using the edge and shadow colors of the current Selector.

-> fedge

Description: Add an edge and/or a shadow to a font.

Also see: `fscale`

Menu: **Font E**

```
fedge oldfont newfont [comment=] [style=] [height=] \
      [shape=] [offset=] [direction=] [shadow=]
```

PARAMETER	DESCRIPTION	DEFAULT
oldfont	Font to be edged	—
newfont	Where to record the edged font. You can record the new font at the old font's number, if you like	—
`comment=`*string*	Add a comment to the edged font	no comment
`style=`*list*	Edge/Shadow style: `edgeshadow, 3d, emboss`	`style=edgeshadow`
`height=`*num*	For `edgeshadow` edge, specifies the thickness of the edge in scan lines. Does not apply to edge styles `3d` and `emboss`.	`height=2`
`shape=`*list*	Shape of `edgeshadow` edge: `round, square`	`shape=round`

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`offset=`*num*	For `edgeshadow` edge, specifies shadow's offset. For `3d` or `emboss`, specifies depth.	`offset=4`
`direction=`*list*	Direction of shadow: `NO, NE, E, SE, SO, SW, W, NW`	`direction=SE`
`shadow=`*list*	For `edgeshadow` edge, specifies type of shadow: `drop, thick.` Does not apply to `3d` or `emboss`.	`shadow=drop`

Notes:

See Chapter 9 for a complete description of edges and shadows. Most operators prefer to use **Font E**, since it's easier to use than `fedge`.

Examples:

```
fedge  220  220  comment="Clarendon Bold 20"
```

puts an `edge/shadow` edge on font 220, adds a comment to the font, and stores the edged font at 220. The default `edge/shadow` edge is round and 2 scan lines high, with a drop shadow 4 scan lines down and to the right (southeast).

```
fedge  3030  3030  comment="Hobo Head 30" \
      style=edgeshadow  height=6  offset=0
```

puts a 6-scan-line edge on font 3030, adding a comment. The new font has no shadow (since `offset=0`).

```
fedge  2416  2417  style=edgeshadow  height=0 \
      offset=16  direction=SW  shadow=thick
```

puts a “thick” style shadow on font 2416, saving the result as font 2417. The shadow goes down and to the left (`SW`) and is 16 scan lines thick (`offset=16`).

```
fedge  1224  1224  comment="Serifa 24"  style=3d \
      offset=4  direction=NW
```

puts a 3-D edge on font 1224. The edge is 4 scan lines deep (`offset=4`) and goes up and to the left (`NW`).

```
fedge  1012  1012  comment="Futura Medium 12" \
      style=emboss  offset=4
```

embosses font 1012 to a depth of 4 scan lines.

-> fscale

Description: Scale a master font to a specific size.

Also see: `fedge`

Menu: **Font A**

```
fscale  masterfont newfont height [hscale=] [filter=] \
          [machine=] [comment=] [-all]
```

PARAMETER	DESCRIPTION	DEFAULT
masterfont	Master font number (60001-60064)	—
newfont	Number for scaled font (1-59999)	—
height	Height of scaled font, in scan lines (1-150)	—
`hscale=`*num*	Horizontal scaling percent	`100`

`filter=`*list*	Anti-aliasing filter to use:
	`narrow (gauss), wide (gauss)`
	`narrow, wide`
		`filter=`
		`narrow (gauss)`

`machine=`*list*	Type of Dubner graphics machine to use with this font	`20-K`
`comment=`*string*	Specify a comment for scaled font	`no comment`
`-all`	Include entire international character set. If `-all` is not specified, only those characters used by the primary and alternate keyboards will be included. See **Confg N** to change keyboard languages.	`-noall`

Examples:

```
fscale  60009  924  24  comment="Futura Light 24"
```

scales master font 60009 to a height of 24 scan lines, records scaled font number 924 and gives it a comment.

```
fscale  60023  2360  60  comment="Windsor 60" machine=gf
```

scales master font 60023 to a height of 60 scan lines, records a 20-K version of the scaled font at font number 2360.

```
fscale  60031  1  150  hscale=50  -all \
        comment="large Condensed Brush Script"
```

creates font 1 from master font 60031, including the international character set. Font 1 is condensed horizontally by 50 percent, and scaled to a height of 150 scan lines.

-> install

Description: Install a new 20-K program on an existing message or font disk.

Menu: **Disk-Util P**

```
install fromdrive todrive [-noask] [-sym]
```

PARAMETER	DESCRIPTION	DEFAULT
fromdrive	Disk to read program from	—
todrive	Disk on which to install program	—
`[-noask]`	Don't prompt for proper disk inserted	`-ask`
`[-sym]`	Include symbol table with installed program	`—nosym`

Notes: Use this command to install new software on your old disks when you receive a software update from Dubner. Existing fonts or messages will not be affected. Make sure the most recent program version is installed on all your disks.

Examples:

```
install  2  1  -noask
```

reads the program from drive 2-Iomega and installs it on 1-Iomega.

```
install  2  2
```

reads the program from 2-Iomega, then asks you to insert a different disk in 2-Iomega, so the program can be installed on a second disk.

-> mag

Description: Magnifies the displayed ppic.

Also see:

Menu: **Bkgd M**

```
magnify num
```

PARAMETER	DESCRIPTION	DEFAULT
num	Magnification factor	1

Examples:

```
magnify  6
```

magnifies the displayed ppic by a factor of six.

-> `make_ntsc`

Description:	Forces logout data on current message disk to be NTSC.
Also see:	`make_pal`
Menu:	none

```
make_ntsc
```

PARAMETER	DESCRIPTION	DEFAULT
none		

Notes: After doing `make_ntsc`, you must re-boot.

-> `make_pal`

Description:	Forces logout data on current message disk to be PAL.
Also see:	`make_ntsc`
Menu:	none

```
make_pal
```

PARAMETER	DESCRIPTION	DEFAULT
none		

Notes: After doing `make_pal`, you must re-boot.

-> memtest

Description: Hardware Diagnostic: tests 20-K memory.

Menu: none

```
memtest start end [m=] [t=] [s=] [p=]
```

PARAMETER	DESCRIPTION	DEFAULT
start	First memory location to test	—
end	Last memory location to test	—
m=*num*	Bits to mask	m=-1
t=*num*	Test select	t=15
s=*list*	Size of one test: l = long word (32 bits) w = word (16 bits) b = byte (8 bytes)	s=l
p=*num*	Number of passes to do 0 = continuous	p=0

-> mosaic

Description: Turns the displayed ppic into a ***mosaic*** of colored tiles, where the color of each tile is determined by the predominant color in that area of the original picture.

Also see:

Menu: **Bkgd A**

```
mosaic width height [step=] [mosaicname=]
```

PARAMETER	DESCRIPTION	DEFAULT
width	Width of one mosaic tile	—
height	Height of one mosaic tile	—
`step=`*num*	Number of intermediate steps. Create a series of backgrounds, in which the tiles get progressively larger. The tiles in the final mosaic background are *width* by *height*. The number of `steps` does not include the first and last backgrounds in the sequence. For example, `step=8` creates ten backgrounds.	

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PARAMETER	DESCRIPTION	DEFAULT
	If `step` is not specified, `mosaic` creates a single background whose tiles are *width* by *height*	
`mosaicname=`*list*	Name and record the `step` frames	—

Note:

After you use `mosaic` to create a series of ppics, use **Bkgd C** or the Do command `combine` to combine all the frames into an animation. Use **Effct A** to play the animation.

Examples:

```
mosaic  30  40
```

creates a mosaic of the current ppic with tiles 30 pixels wide and 40 scan lines high.

```
mosaic  30  40  step=6  mosaicname=boo
```

creates and records an eight frame mosaic of the current ppic. The ppics are recorded under the names boo, boo1, boo2, etc. The mosaic tiles in the final frame are thirty pixels wide and 40 scan lines high.

-> move

Description: Moves the displayed ppic.

Also see:

Menu:

```
move  [v=]  [h=]
```

PARAMETER	DESCRIPTION	DEFAULT
v=*num*	Vertical offset	v=0
h=*num*	Horizontal offset	h=0

Examples:

```
move  v=30
```

moves the displayed ppic up 30 scan lines.

```
move  v=-30  h=100
```

moves the displayed ppic down 30 scan lines and 100 pixels to the right.

-> print

Description: Print files and directories.

Also see:

Menu: **Dir P**

```
print fromdrive [firstmsg] [lastmsg] [type=] [-dir] \
            [-ask]
```

PARAMETER	DESCRIPTION	DEFAULT

fromdrive	`1-Iomega`
	`2-Iomega`
	`3-Iomega`
	`4-Iomega`
	`5-Wren`
		—

firstmsg	First message to print	Print all messages
lastmsg	Last message to print	
`type=`*list*	`msgs, font, text, tabs, seq, kpgm, wpal, wseq`	—
`-dir`	Print the directory	`-nodir`
`-ask`	Prompt for disk to be inserted before proceeding	`-noask`

Examples:

```
print  2  barney  type=text  -ask
```

prints the text message `barney` from 2-Iomega. The status monitor prompts for the disk to be inserted.

```
print  1  type=font  -dir
```

prints the font directory of 1-Iomega.

-> `rclock`

Description:	Run a clock.
Also see:	`sclock`
Menu:	**Bkgd L R**

`rclock` *message name*

PARAMETER	DESCRIPTION	DEFAULT
none		

`-> read`

Description:	Read a message from the current message drive.
Menu:	**Read**

`read` *msgname* `[-partial]`

PARAMETER	DESCRIPTION	DEFAULT
msgname	Name of message to read	—
`-partial`	Don't erase the screen before reading a text message (i.e., do an **Alt Read**)	`-erase`

Notes: You must be in the proper program mode to read certain message types. For example, you must be in K Edit mode to read in a K program, and you must be in Sequence mode to read in a sequence. The status monitor will tell you if a message cannot be read in the current mode.

Examples:

```
read  text2
```

reads message `text2`.

-> reboot

Description:	Restarts the 20-K program (simulates pressing the RESET button).
Also see:	`install`
Menu:	none

```
reboot
```

PARAMETER	DESCRIPTION	DEFAULT
none		

Examples:

```
reboot
```

reads the 20-K program from the current program disk and restarts it.

-> `rename`

Description: Change the name of a recorded message or font.

Also see: `comment`

Menu: **Dir R**

```
rename drive oldmsg newmsg [type=]
```

PARAMETER	DESCRIPTION	DEFAULT
drive	Disk where message is recorded	—
oldmsg	Original name of message	—
newmsg	New name for message	—
`type=`*msgtype*	Use `type=font` to rename a font	`type=msgs`

Examples:

```
rename 1 mets yanks
```

changes the name of a message on 1-Iomega from `mets` to `yanks`.

```
rename 2 224 50224 type=font
```

changes the number of font 224 on drive 2-Iomega to font 50224.

-> sclock

Description: Set the clock.

Also see: `rclock`

Menu: **Bkgd L S**

```
sclock clockid hh:mm:ss.t type  [-s] [-t]
```

PARAMETER	DESCRIPTION	DEFAULT
clockid	1-4	—
hh:mm:ss.t	Set the clock at this hour, minutes and seconds.	—
type	up = Count up in 12-hr format um = Count up in 24-hr format ds = Count down to 0:00 and stop du = Count down to 0:00 and up	
-s	Suppress leading zeroes when there are no hours, minutes, etc	Display leading zeroes
-t	Wait for a trigger to start the clock	Start the clock immediately

Examples:

```
sclock  02:23:10.5  up  -s  -t
```

Sets the clock at 2:23:10.5 It will run indicating tenths of a second, counting up in a 12-hour format. The clock will wait for the trigger before starting.

```
sclock  02:10:10  ds
```

Sets the clock at 02:10:10. The clock starts running immediately, counts down to 0:00 and stops. The clock displays the leading zero.

```
sclock  02:10:10  du  -s  -t
```

Sets the clock at 02:10:10. The clock waits for a trigger then starts running, counts down to 0:00 then up. It suppresses the leading 0.

-> select

Description: Select current message and font drives.

Menu: **Dir S**

```
select [msgdrive] [fontdrive]
```

PARAMETER	DESCRIPTION	DEFAULT
msgdrive	Disk to read messages from, and to record messages on	Current message drive
fontdrive	Disk to read fonts from, and to record fonts on	Current font drive

Examples:

```
select 1 2
```

selects 1-Iomega for messages, 2-Iomega for fonts.

```
select 1 1
```

selects 1-Iomega for both messages and fonts.

```
select 2
```

selects 2-Iomega for messages, but does not change current font drive.

-> setport

Description:	Configure one of the 20-K's four serial ports, for both hardware protocol and software application.
Also see:	Section 10.4, "Configuring the Serial Ports."
Menu:	**Confg P**

```
setport port [protocol=] [baud=] [bits=] [parity=] \
        [stop=] [handshake=] [usage=] [emem=] \
        [user=]
```

PARAMETER	DESCRIPTION	DEFAULT
port	Which port to configure (1-4)	—
`protocol=`*list*	Port protocol: `rs232, rs422`	`protocol=rs232`
`baud=`*list*	Baud rate: `600, 1200, 2400, 4800, 9600, 19200, 38400`	`baud=9600`
`bits=`*list*	Number of data bits: `5,6,7,8`	`bits=8`
`parity=`*list*	`even, odd, none`	`parity=none`
`stop=`*list*	Number of stop bits: `1,2`	`stop=1`
`handshake=`*list*	Handshake protocol: `xin, xout, xboth, none`	`handshake=none`

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`usage=`*list*	Port Usage (see **Confg P**): `off, kbd, host, emem, dataio, pegs, digi, pad, elec, print, weath, kdata, callup`	`usage=kbd`
emem=*num*	For `usage=emem`, specifies emem channel number (0–7)	emem=0
`user=`*list*	Port User: `off, 1, 2`	`user=1`

Examples:

```
setport  4  protocol=rs232  bits=8  parity=none \
   stop=1  handshake=x-in  usage=PRINTER  user=1
```

configures port 4 for a printer.

HINT: Use **Confg P** to configure the 20-K serial ports. It's a lot easier to use than `setport`.

`-> sin`

Description: Returns the sine of the supplied angle.

Also see: `cos, sqrt, tan`

Menu:

[*$sin=*] `sin` *angle* `[-d]`

PARAMETER	DESCRIPTION	DEFAULT
angle	Angle (in degrees)	—
`-d`	Displays the results on the status monitor	`-nod` —

Examples:

$answer = `sin 30 -d`

sets the value of the K variable *$answer* to the sine of 30 degrees and displays the result on the status monitor.

-> sqrt

Description:	Returns the square root of the supplied number and displays it on the status monitor.
Also see:	
Menu:	

[*$sqrt=*] `sqrt` *number*

PARAMETER	DESCRIPTION	DEFAULT
number	`sqrt` returns the square root of this *number* and displays it on the status monitor	

Examples:

$answer = `sqrt 324`

sets the value of the K variable *$answer* to 18.000 and displays the result on the status monitor

`-> tan`

Description:	Returns the tangent of the supplied angle.
Also see:	`cos, sin, sqrt`

Menu:

```
[$tan=]   tan   angle   [-d]
```

PARAMETER	DESCRIPTION	DEFAULT
angle	Angle (in degrees)	—
-d	Displays the results on the status monitor	-nod —

Examples:

```
$answer = tan   30   -d
```

sets the value of the K variable *$answer* to the tangent of 30 degrees and displays the result on the status monitor.

-> textdelete

Description:	Delete on-screen text, starting from the cursor character and continuing through the end of the cursor word.
Also see:	`textfind`
Menu:	**Text W**

```
textdelete
```

PARAMETER	DESCRIPTION	DEFAULT
none		

Examples:

```
textdelete
```

with the cursor over the "b" in Dubner, deletes the characters b-n-e-r.

-> textfind

Description:	Find a string of characters in on-screen text, position the text cursor over the first character in the string.
Menu:	**Text F**

```
textfind string
```

PARAMETER	DESCRIPTION	DEFAULT
string	The characters to search for	—

Examples:

```
textfind  clem
```

finds the string "clem" in on-screen text, positions the text cursor over the "c."

```
textfind "not me"
```

finds the string "not me". Note that the quotation marks are necessary because the string contains an imbedded space.

-> weave

Description:	Weave the current foreground into the background; or, weave two series of messages and record the resulting ppics. The messages may be text or ppics.
Also see:	`combine`
Menu:	**Bkgd W, Bkgd V**

`weave` [*firstfgd lastfgd firstbgd lastbgd result*]

PARAMETER	DESCRIPTION	DEFAULT
firstfgd	First fgd message	—
lastfgd	Last fgd message	—
firstbgd	First bgd message	—
lastbgd	Last bgd message	—
result	Where to record the first bgd in the resulting series. Subsequent bgds will be recorded with the name of the previous bgd plus 1	—

Notes: `Weave` with no parameters weaves the current foreground into the current background. To weave two series of messages, you must specify all five parameters.

If the two original series do not contain the same number of images, the shorter series is cycled until the longer series is completed. For instance, if *firstfgd* and *lastfgd* are the same, then that message will be woven onto each image of the background series.

Examples:

```
weave
```

weaves the current foreground text into the background. The original text also remains in the foreground. Nothing is recorded.

```
weave  bear1  bear3  cave  cave  bearcave1
```

weaves the message `bear1` over the message `cave` and records the result at `bearcave1`; weaves `bear2` over `cave` and records at `bearcave2`; weaves `bear3` over `cave` and records at `bearcave3`.

```
weave  score1  score50  box1  box10  boxscore1
```

weaves the series of text messages `score1` through `score50` over the series of ppics `box1` through `box10`, recording the resulting ppics at `boxscore1` through `boxscore50`. The `box1` series, since it contains only ten different ppics, repeats five times to accommodate all 50 scores.

-> xform

Description: Transform the current ppic, by rotating, scaling, or moving it.

```
xform [s=] [sx=] [sy=] [sz=] [rx=] [ry=] [rz=] \
      [mx] [my=] [mz=] [ox=] [oy=] [oz=] [eye=] \
      [-nojag] [-average]
```

PARAMETER	DESCRIPTION	DEFAULT
s=*num*	Scale in all dimensions	1.0
sx=*num*	Scale in horizontal dimension	1.0
sy=*num*	Scale in vertical dimension1.0	
sz=*num*	Scale in z dimension	1.0
rx=*num*	Rotate about x axis	0.0
ry=*num*	Rotate about y axis	0.0
rz=*num*	Rotate about z axis0.0	
mx=*num*	Move in x direction	0.0
my=*num*	Move in y direction	0.0
mz=*num*	Move in z direction	0.0

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PARAMETER	DESCRIPTION	DEFAULT
`ox=`*num*	Set x origin for rotate and scale	`0.0`
`oy=`*num*	Set y origin for rotate and scale	`0.0`
`oz=`*num*	Set z origin for rotate and scale`0.0`	
`eye=`*num*	Set the distance from the eye to the screen. 2.0 is two screen heights distant	`2.0`
`-nojag`	Provides a high-quality filter	`-nonojag`
`-average`	Average odd lengths. Do not extend odd length runs to make them an even number of pixels long	`-noaverage`

Notes: We recommend that you use the default `nonojag` filter while you are experimenting with the parameters to the `xform` command. When you have determined the proper `xform`, use the `nojag` filter for the best results.

Examples:

```
xform  s=2
```

makes the ppic twice as big.

```
xform  sx=.5
```

makes the ppic half as wide, preserving its original height.

```
xform  rx=30
```

rotates the ppic 30 degrees around the center pixel of the screen.

```
xform   ox=-200  oy=-100  rz=30  -nojag
```

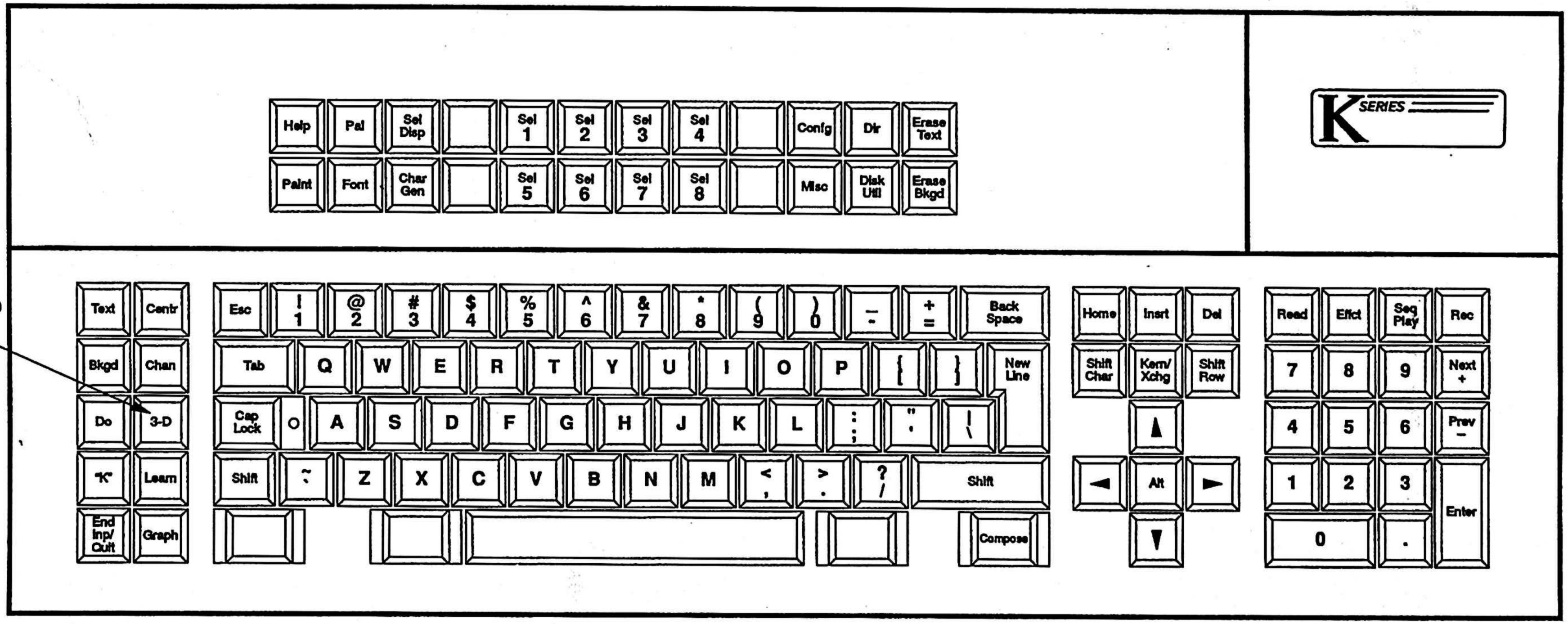
rotates the ppic 30 degrees around a point 200 pixels to the left and 100 pixels above the center pixel of the screen. Filters the image.

```
xform  mx=-200  my=100
```

moves the ppic 200 pixels left, 100 pixels down.

Appendix A: KEYBOARDS

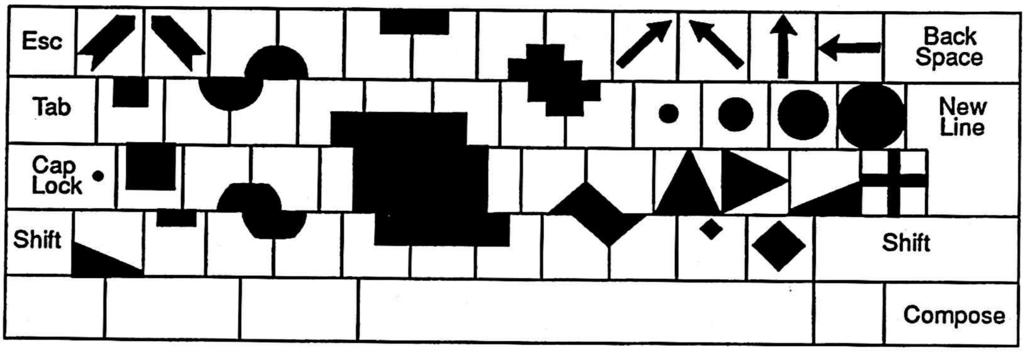
Standard Keyboard


K SERIES
Help
Pal
Sel Disp
Sel 1
Sel 2
Sel 3
Sel 4
Config
Dir
Erase Text
Paint
Font
Char Gen
Sel 5
Sel 6
Sel 7
Sel 8
Misc
Disk Util
Erase Bkgd
Text
Centr
Bkgd
Chan
Do
3-D
"K"
Learn
End Inp/ Out
Graph
Esc
! 1
@ 2
# 3
$ 4
% 5
^ 6
& 7
* 8
(9
) 0
_ -
+ =
Back Space
Tab
Q
W
E
R
T
Y
U
I
O
P
{ [
}]
New Line
Cap Lock
A
S
D
F
G
H
J
K
L
: ;
" '
| \
Shift
~ `
Z
X
C
V
B
N
M
< ,
> .
? /
Shift
Compose
Home
Insrt
Del
Shift Char
Kern/ Xchg
Shift Row
▲
◄
Alt
►
▼
Read
Effct
Seq Play
Rec
7
8
9
Next +
4
5
6
Prev −
1
2
3
Enter
0
.

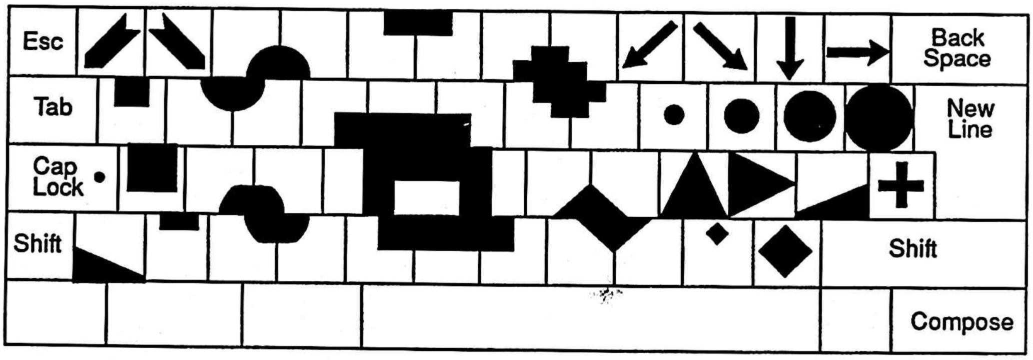
"Elec" key also used here

Boxfill/Graphics Font Keycaps

Upper Case Keycaps


Esc
Back Space
Tab
New Line
Cap Lock
Shift
Shift
Compose

Lower Case Keycaps


Esc
Back Space
Tab
New Line
Cap Lock
Shift
Shift
Compose

International Character Sets

Accents 1

1	2	3	4	5	6	7	8	9	0
`	´	^	ˇ	˚	·	¨	˜	¯	˘

Alternate Character Keys

Accents 2

1	2	3	4	5	6	7	8	9	0
˛	¸	˝							

Alternate Character Keys

Symbols 1

1	2	3	4	5	6	7	8	9	0
¿	¡	§	£	¥	†	‡	‰	ƒ	ß

Alternate Character Keys

Symbols 2

1	2	3	4	5	6	7	8	9	0
Œ	œ	Ø	ø	Æ	æ	Þ	þ	Ł	ł

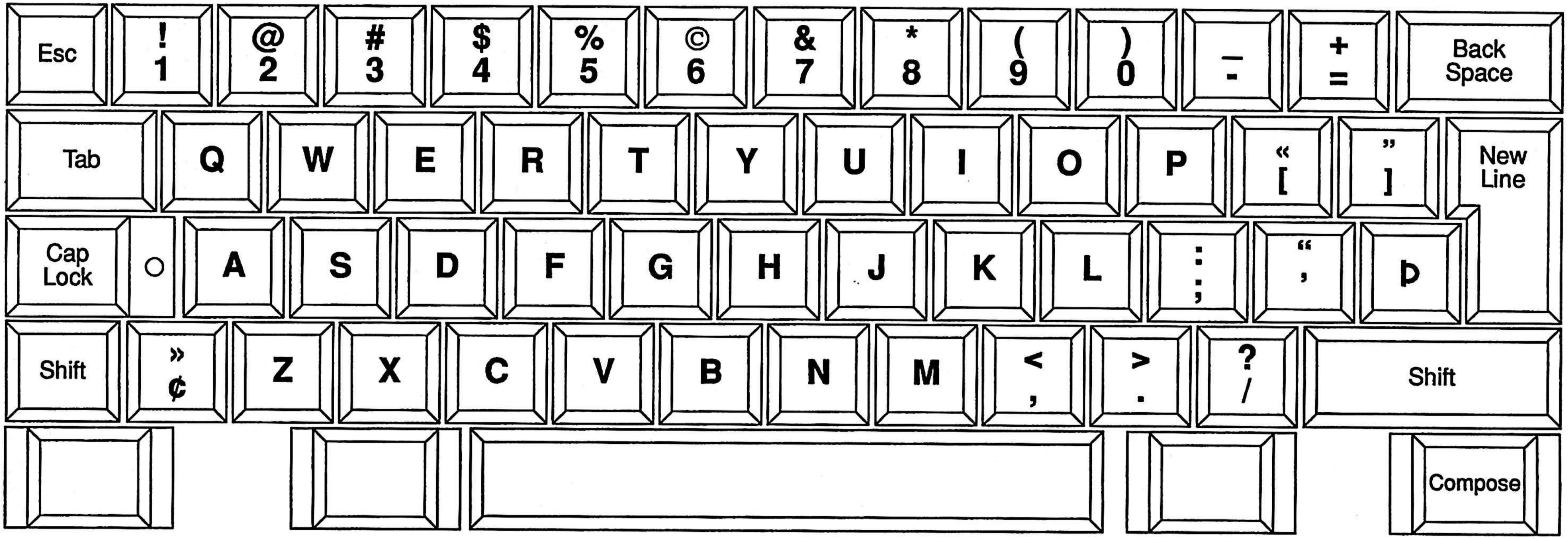
Alternate Character Keys

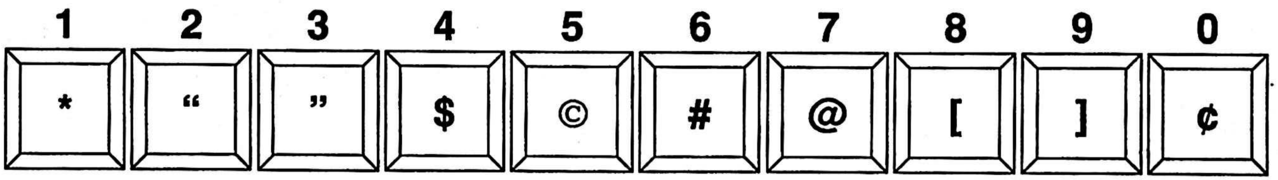
Symbols 3

1	2	3	4	5	6	7	8	9	0
Ç	ç	Đ	ð	đ	º	º			

Alternate Character Keys

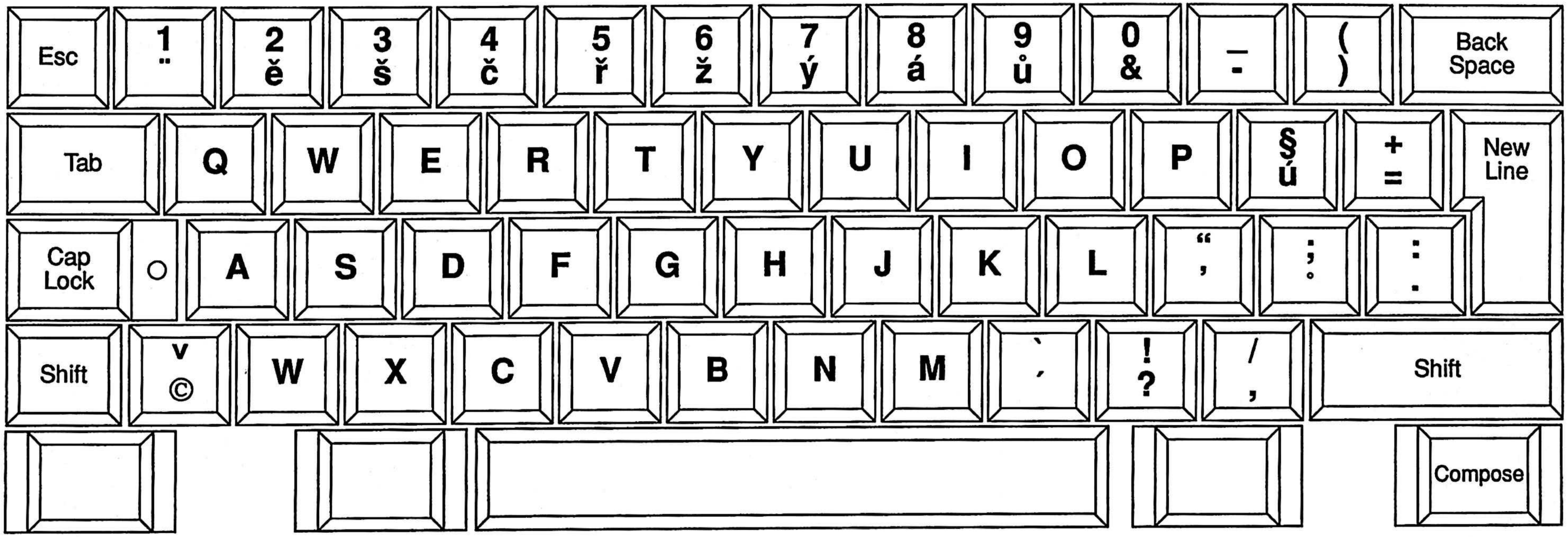
American English

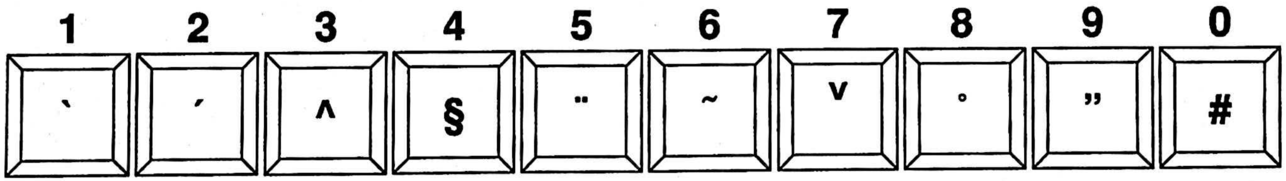

Esc
! 1
@ 2
# 3
$ 4
% 5
© 6
& 7
* 8
(9
) 0
_ -
+ =
Back Space
Tab
Q
W
E
R
T
Y
U
I
O
P
« [
»]
New Line
Cap Lock
○
A
S
D
F
G
H
J
K
L
: ;
“ ,
þ
Shift
» ¢
Z
X
C
V
B
N
M
< ,
> .
? /
Shift
Compose


1
2
3
4
5
6
7
8
9
0
*
“
”
$
©
#
@
[
]
¢

Alternate Character Keys

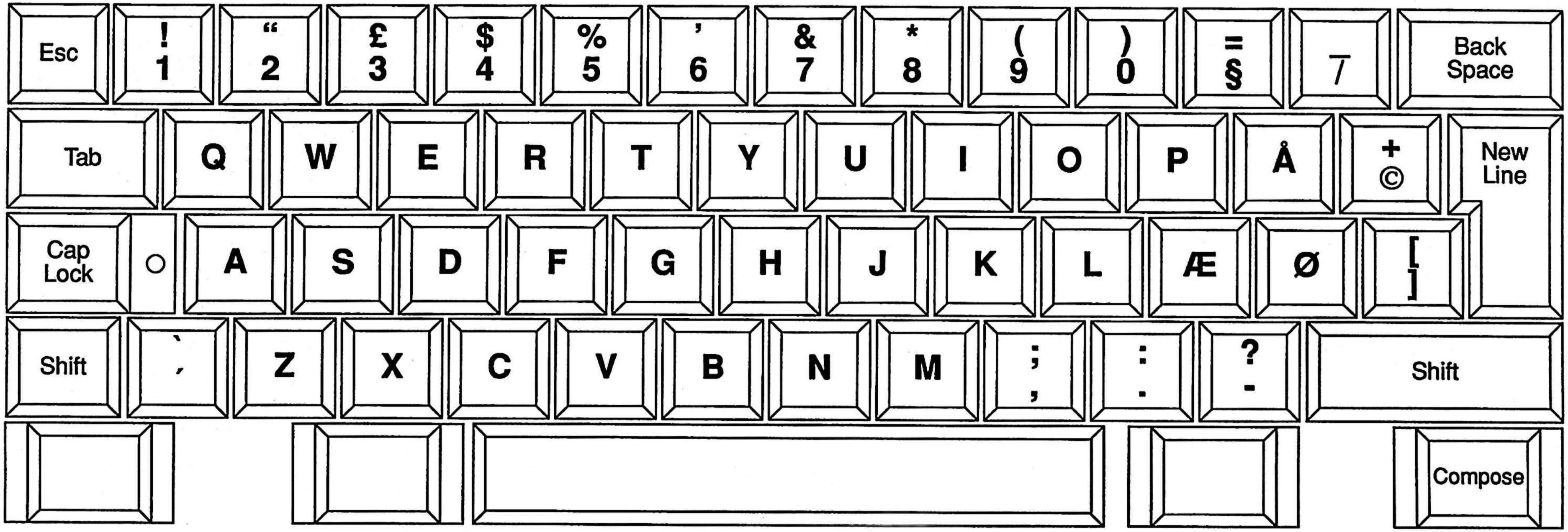
Czech

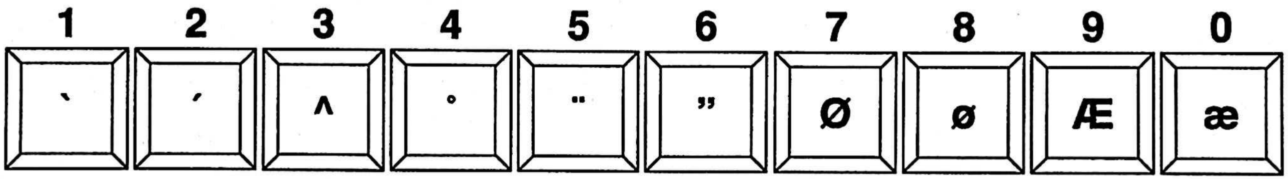

Esc
1 ¨
2 ě
3 š
4 č
5 ř
6 ž
7 ý
8 á
9 ů
0 &
_ -
( )
Back Space
Tab
Q
W
E
R
T
Y
U
I
O
P
§ ú
+ =
New Line
Cap Lock
○
A
S
D
F
G
H
J
K
L
“ ,
; °
: .
Shift
ˇ ©
W
X
C
V
B
N
M
` ´
! ?
/ ,
Shift
Compose


1 `
2 ´
3 ^
4 §
5 ¨
6 ~
7 ˇ
8 °
9 ”
0 #

Alternate Character Keys

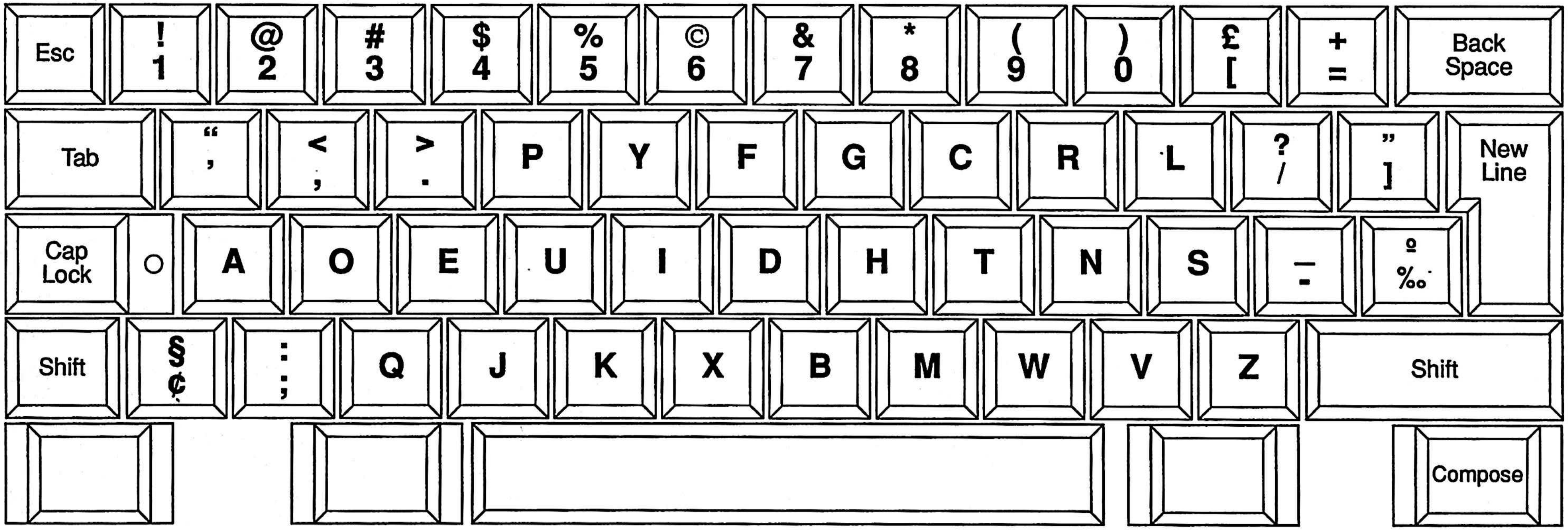
Danish

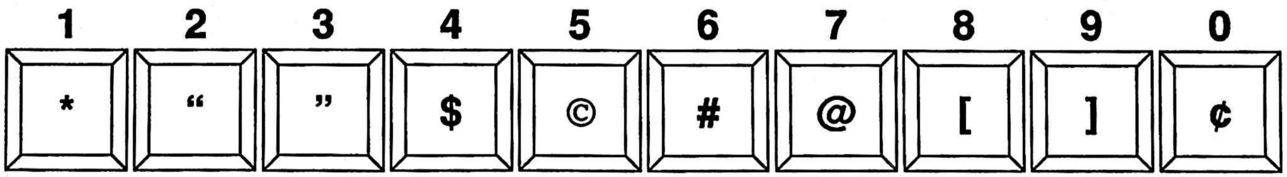

Esc
! 1
“ 2
£ 3
$ 4
% 5
’ 6
& 7
* 8
(9
) 0
= §
‾ /
Back Space
Tab
Q
W
E
R
T
Y
U
I
O
P
Å
+ ©
New Line
Cap Lock
○
A
S
D
F
G
H
J
K
L
Æ
Ø
[ ]
Shift
` ,
Z
X
C
V
B
N
M
; ,
: .
? -
Shift
Compose


1
`
2
´
3
^
4
°
5
¨
6
”
7
Ø
8
ø
9
Æ
0
æ

Alternate Character Keys

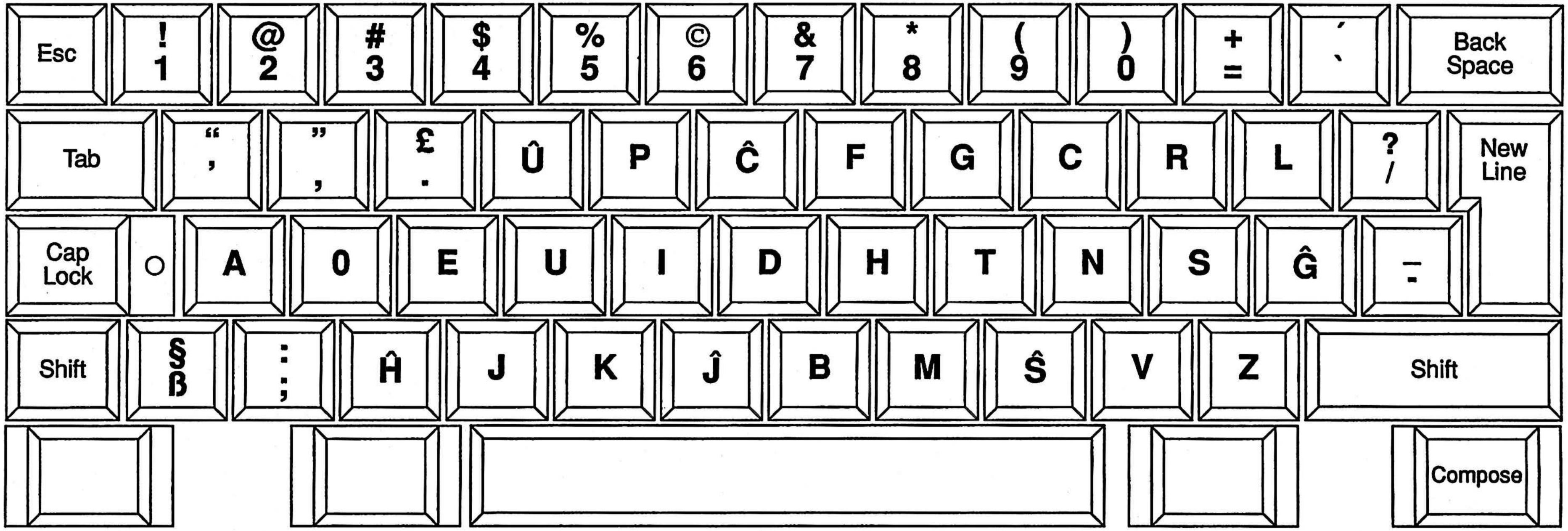
Dvorak (English)


Esc
!
1
@
2
#
3
$
4
%
5
©
6
&
7
*
8
(
9
)
0
£
[
+
=
Back Space
Tab
“
,
<
,
>
.
P
Y
F
G
C
R
L
?
/
”
]
New Line
Cap Lock
○
A
O
E
U
I
D
H
T
N
S
—
-
º
‰
Shift
§
¢
:
;
Q
J
K
X
B
M
W
V
Z
Shift
Compose


1
2
3
4
5
6
7
8
9
0
*
“
”
$
©
#
@
[
]
¢

Alternate Character Keys

Esperanto


Esc
! 1
@ 2
# 3
$ 4
% 5
© 6
& 7
* 8
(9
) 0
+ =
´ `
Back Space
Tab
“ ,
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V
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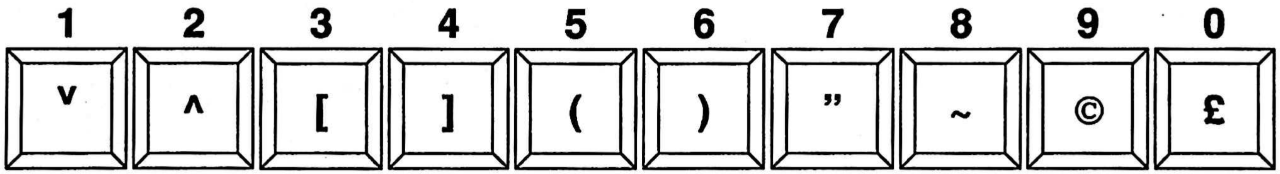
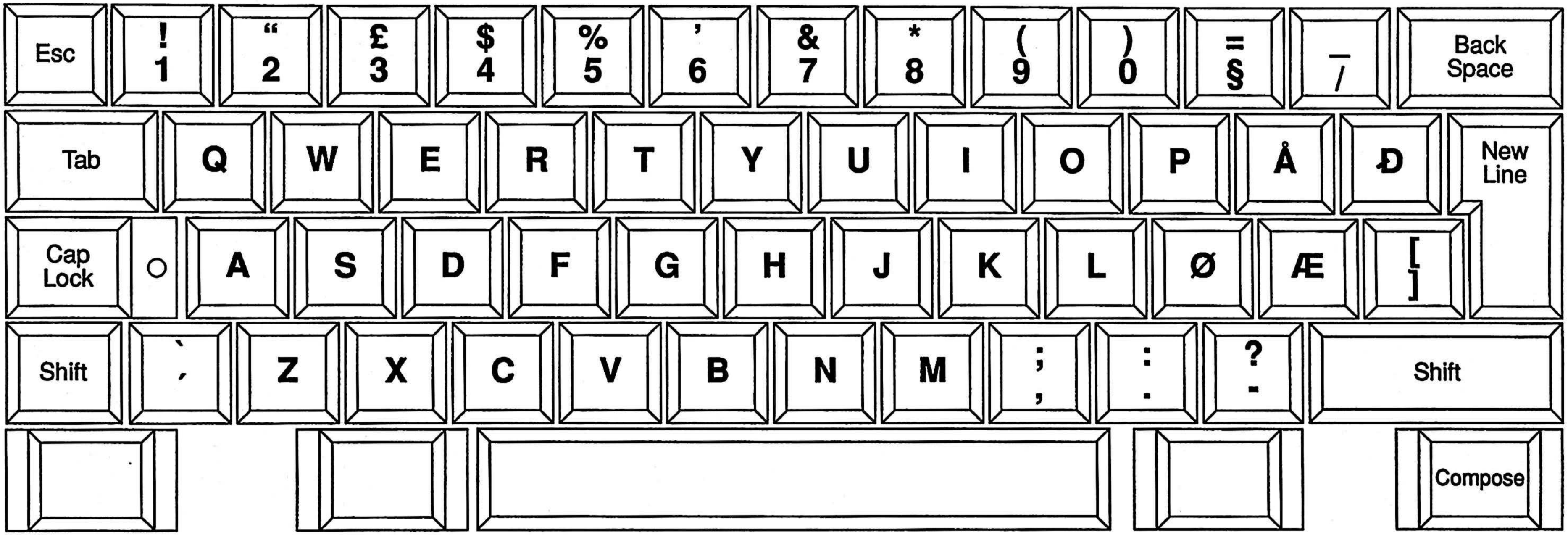
Shift
Compose


1 v
2 ^
3 [
4]
5 (
6)
7 ”
8 ~
9 ©
0 £

Alternate Character Keys

Faeroe Island


Esc
! 1
“ 2
£ 3
$ 4
% 5
’ 6
& 7
* 8
(9
) 0
= §
_ /
Back Space
Tab
Q
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Shift
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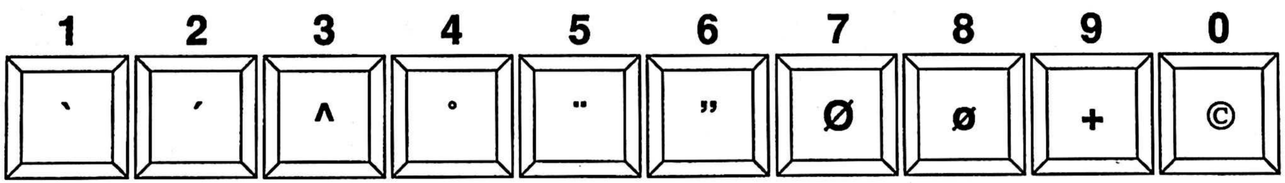
? -
Shift
Compose


1
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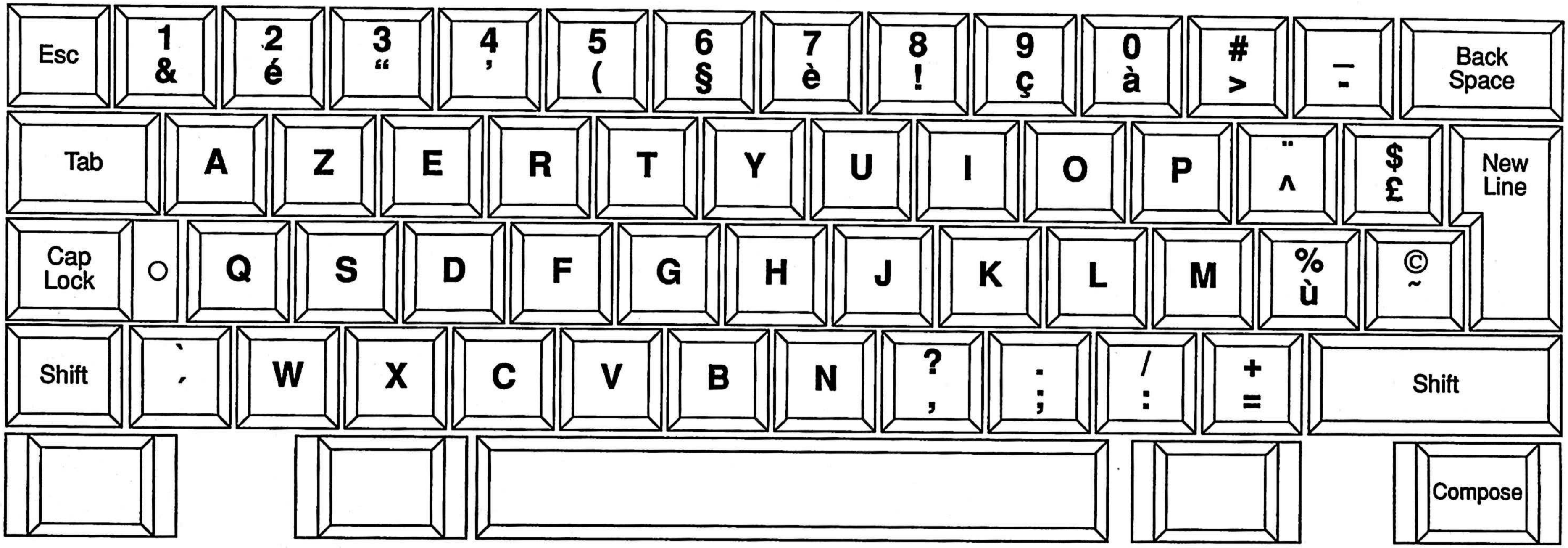
©

Alternate Character Keys

French


Esc
1 &
2 é
3 “
4 ’
5 (
6 §
7 è
8 !
9 ç
0 à
# >
— -
Back Space
Tab
A
Z
E
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Y
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O
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¨ ^
$ £
New Line
Cap Lock
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% ù
© ~
Shift
` ,
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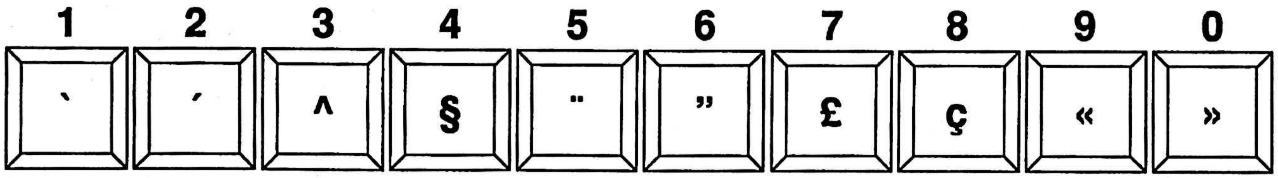
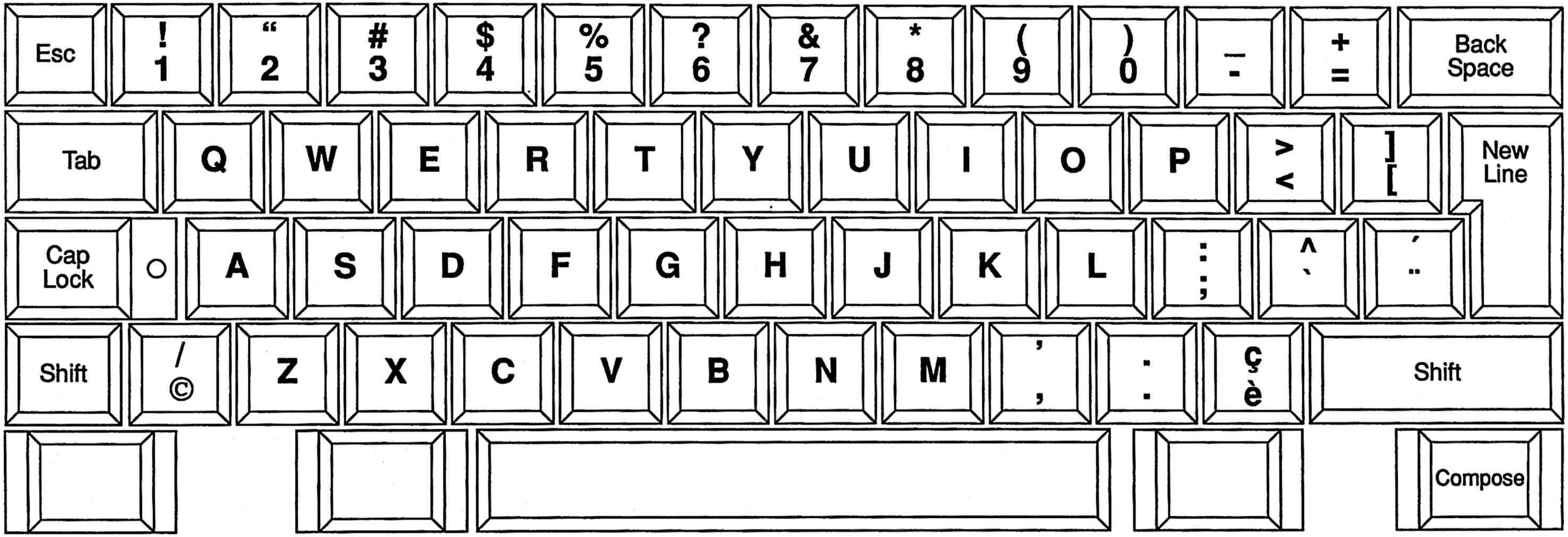
? ,
. ;
/ :
+ =
Shift
Compose


1 `
2 ´
3 ^
4 §
5 ¨
6 ”
7 £
8 ç
9 «
0 »

Alternate Character Keys

French Canadian


Esc
! 1
“ 2
# 3
$ 4
% 5
? 6
& 7
* 8
(9
) 0
_ -
+ =
Back Space
Tab
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Shift
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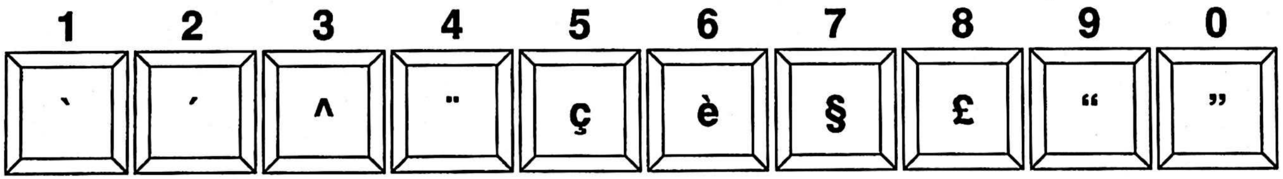
Shift
Compose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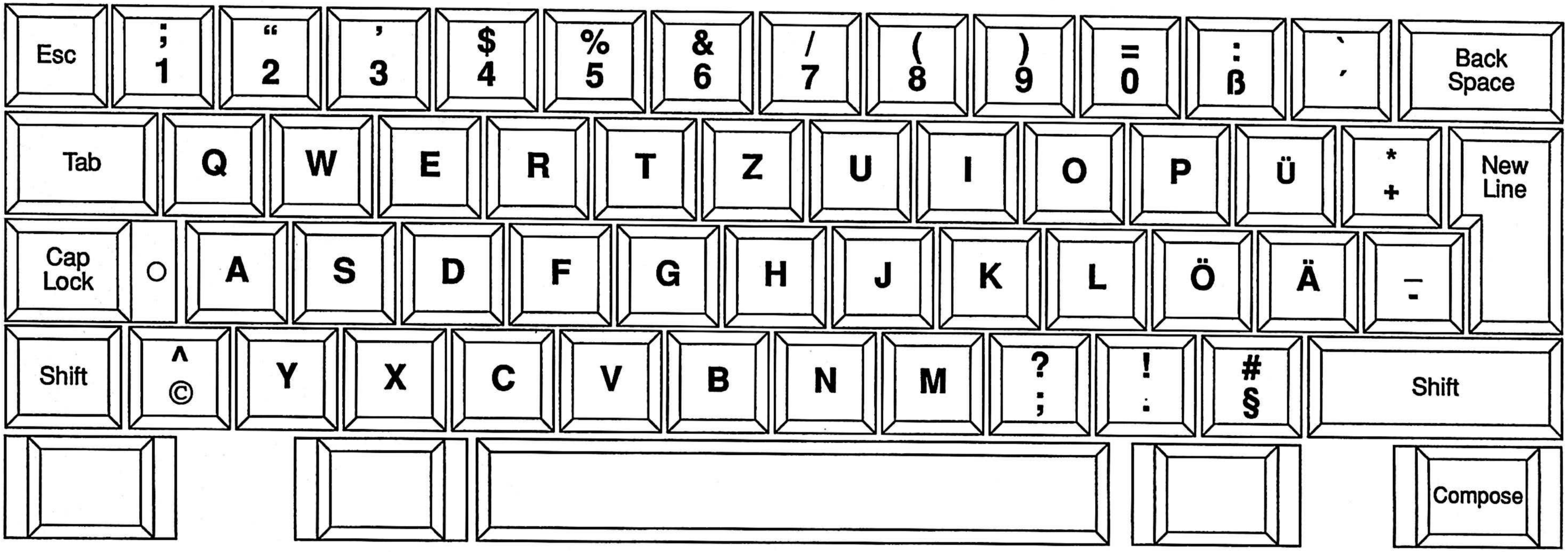
Alternate Character Keys

German



Esc
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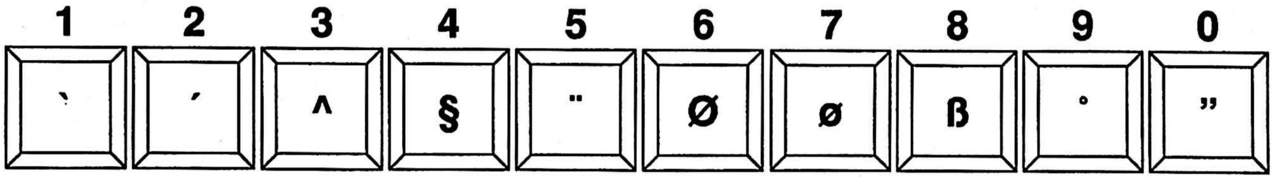
Shift
Compose



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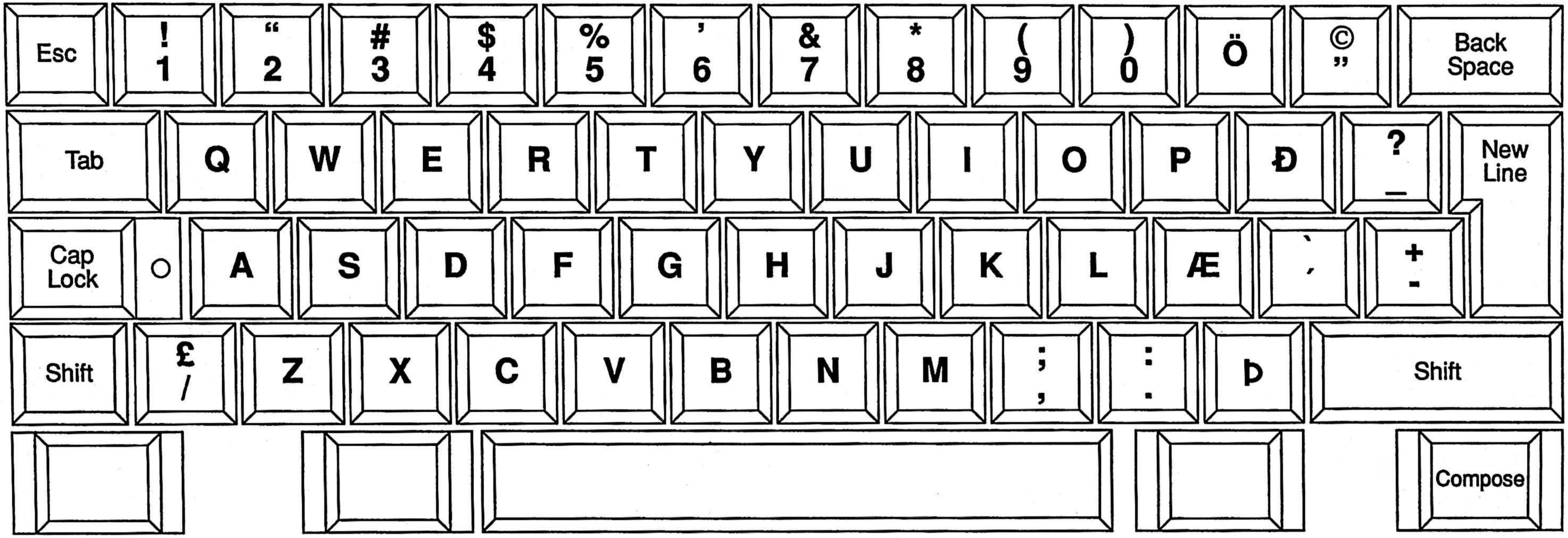
Alternate Character Keys

Icelandic


Esc
! 1
“ 2
# 3
$ 4
% 5
’ 6
& 7
* 8
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) 0
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© ”
Back Space
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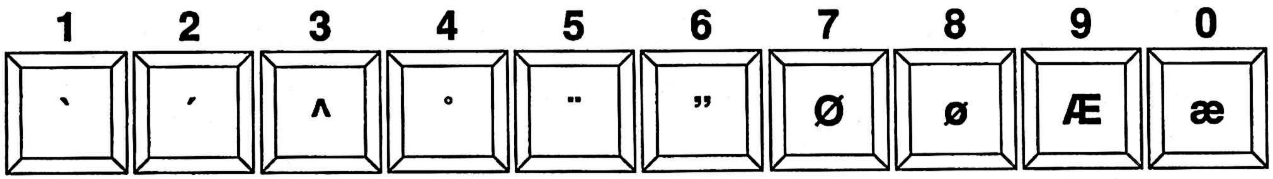
Compose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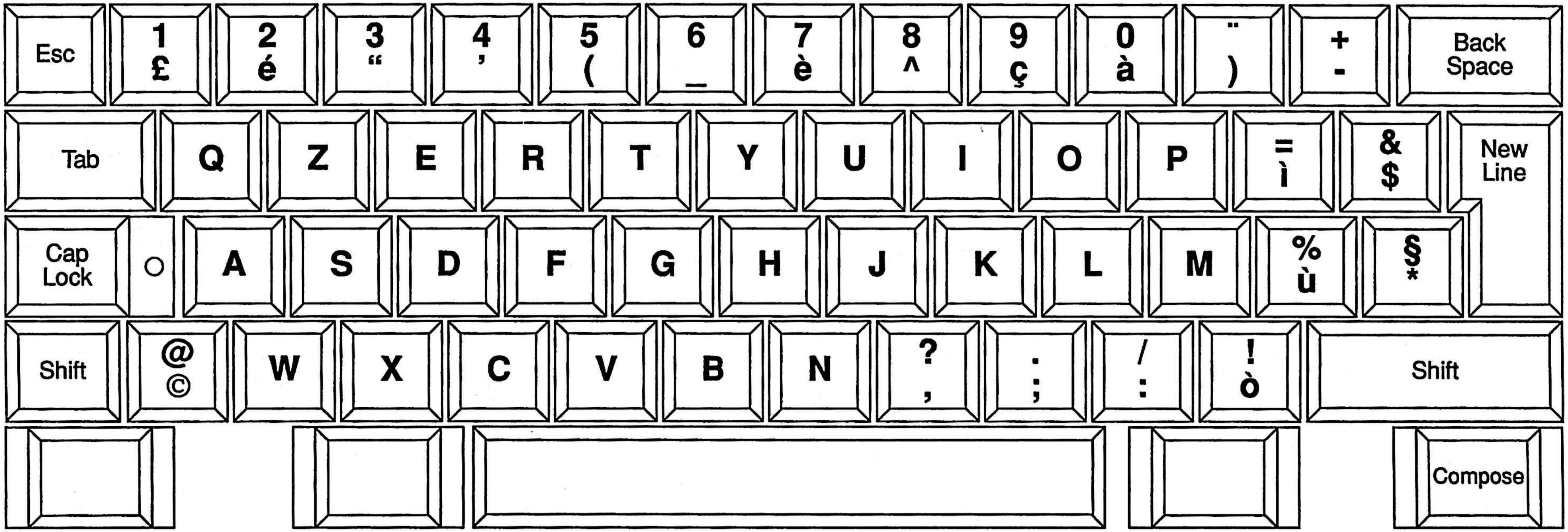
Alternate Character Keys

Italian


Esc
1 £
2 é
3 “
4 ’
5 (
6 _
7 è
8 ^
9 ç
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Back Space
Tab
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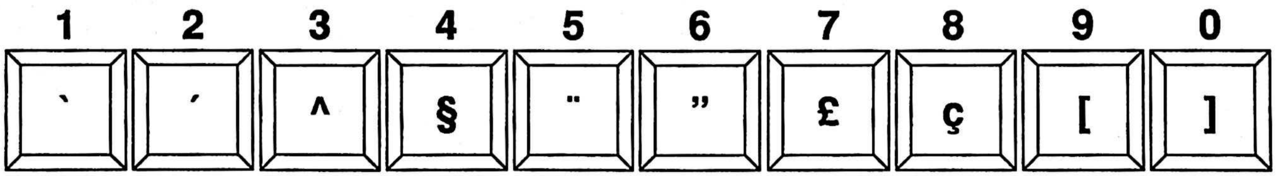
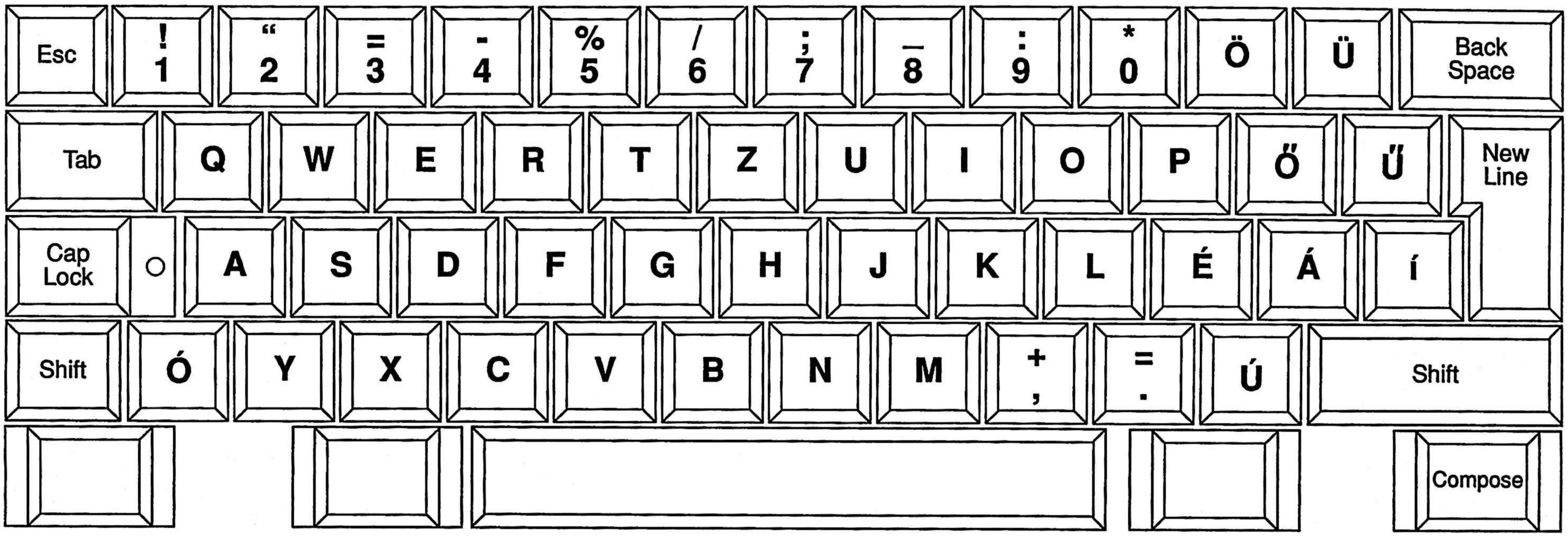
Shift
Compose


1 `
2 ´
3 ^
4 §
5 ¨
6 ”
7 £
8 ç
9 [
0]

Alternate Character Keys

Magyar


Esc
! 1
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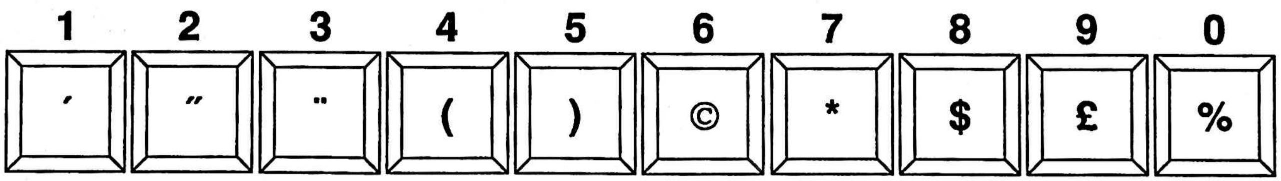
Compose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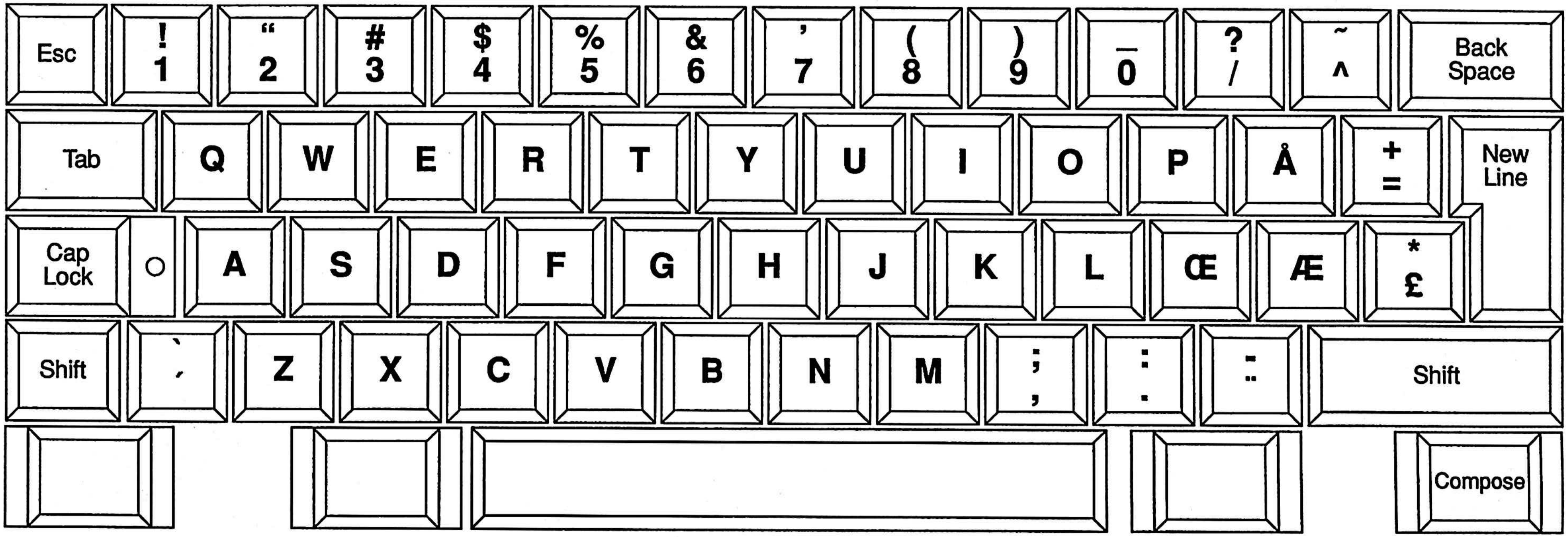
Alternate Character Keys

Norwegian


Esc
! 1
“ 2
# 3
$ 4
% 5
& 6
’ 7
(8
) 9
_ 0
? /
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Back Space
Tab
Q W E R T Y U I O P Å
+ =
New Line
Cap Lock
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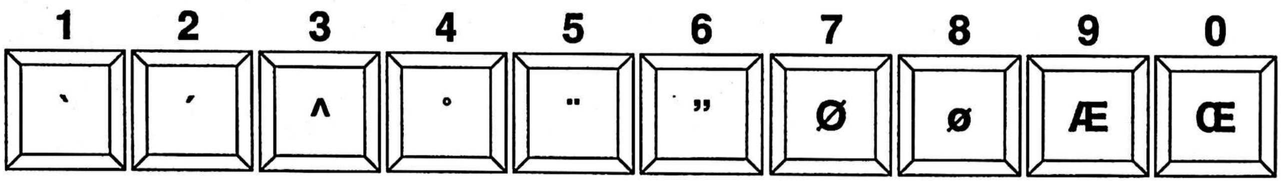
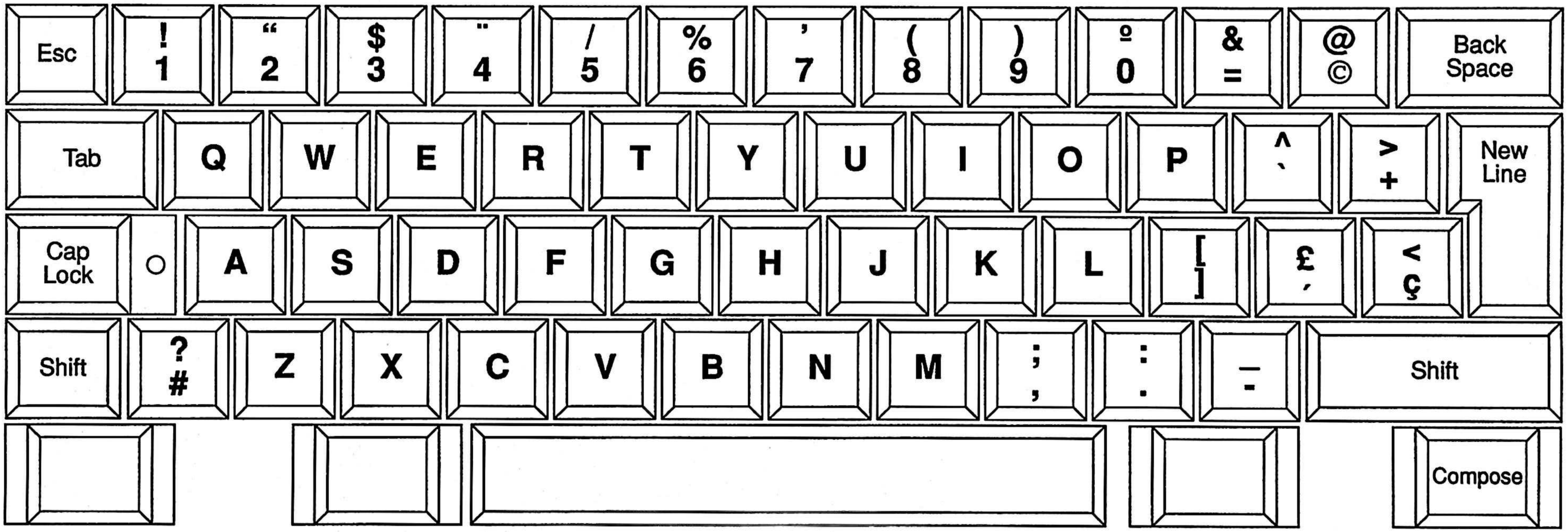
* £
Shift
` ,
Z X C V B N M
; ,
: .
¨ ..
Shift
Compose


1 2 3 4 5 6 7 8 9 0
` ´ ^ ° ¨ „ Ø ø Æ Œ

Alternate Character Keys

Portuguese


Esc
! 1
“ 2
$ 3
¨ 4
/ 5
% 6
’ 7
(8
) 9
º 0
& =
@ ©
Back Space
Tab
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New Line
Cap Lock
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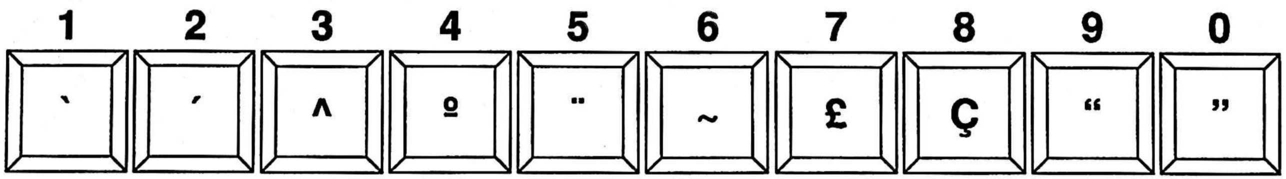
Shift
Compose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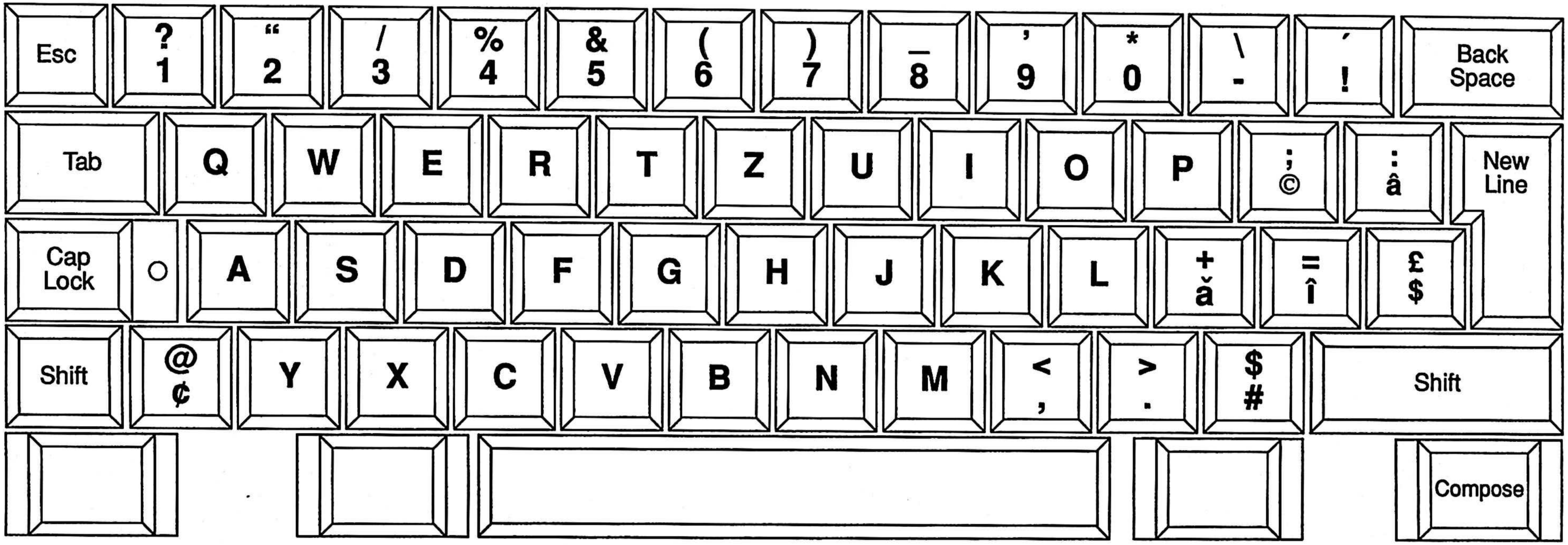
Alternate Character Keys

Rumanian


Esc
? 1
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’ 9
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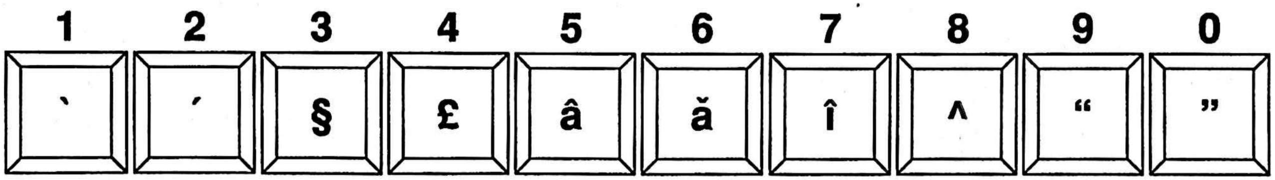
Compose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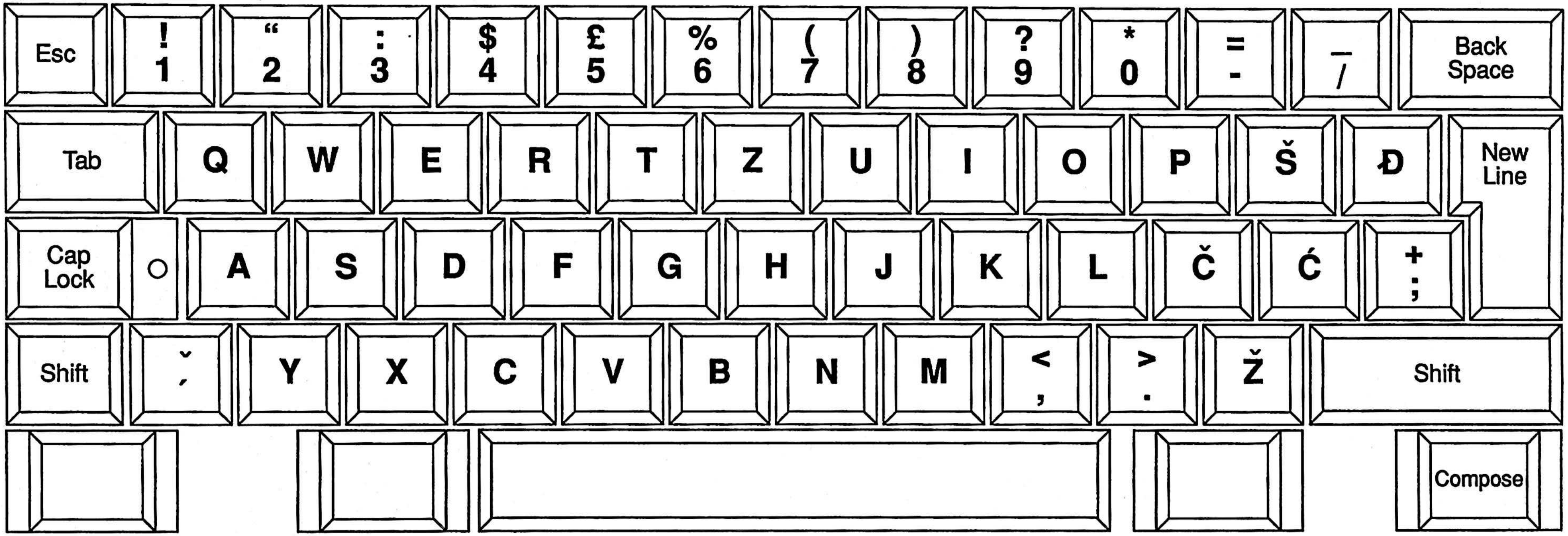
Alternate Character Keys

Serbocroation


Esc
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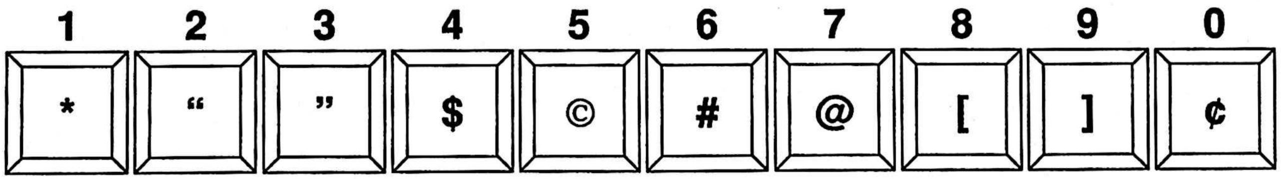
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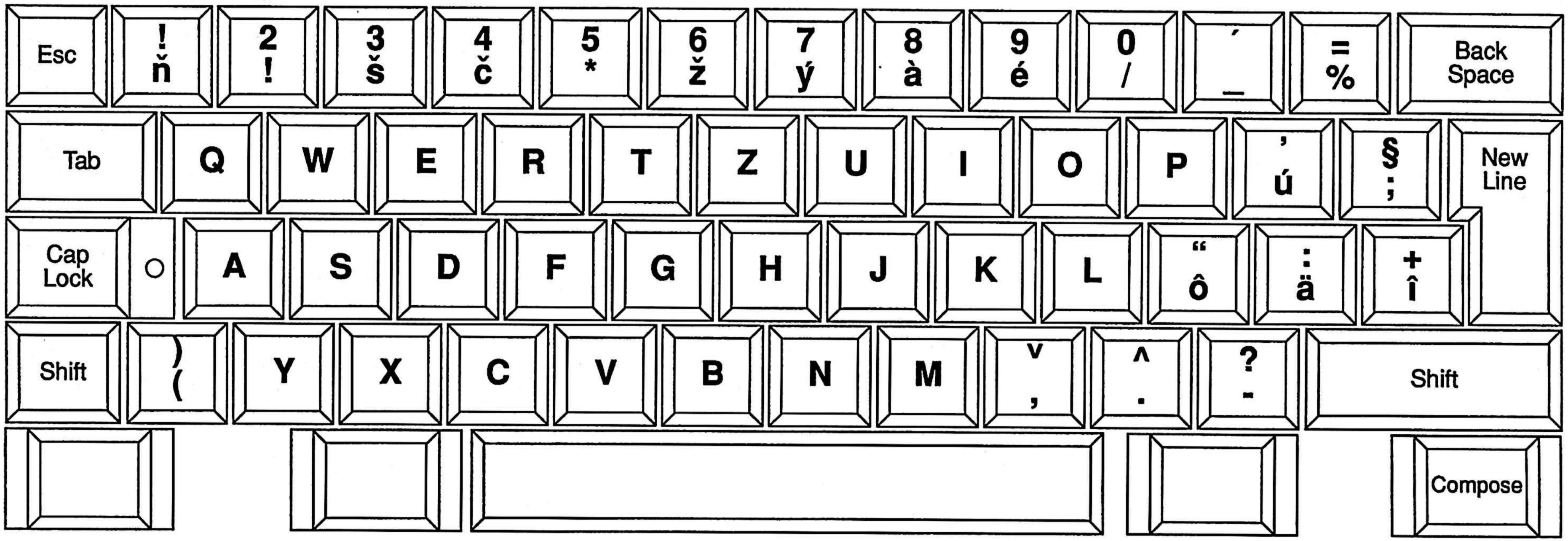
Alternate Character Keys

Slovakian 1


Esc
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New Line
Cap Lock
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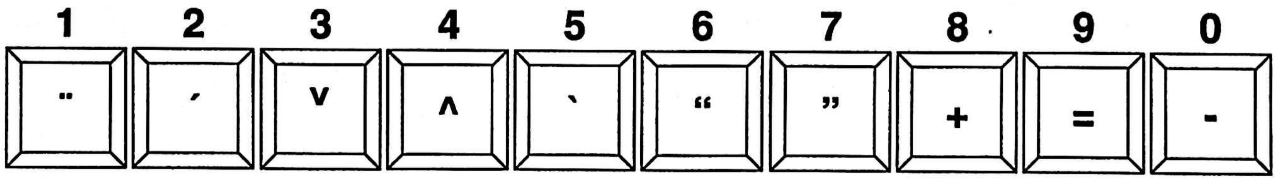
Shift
Compose


1
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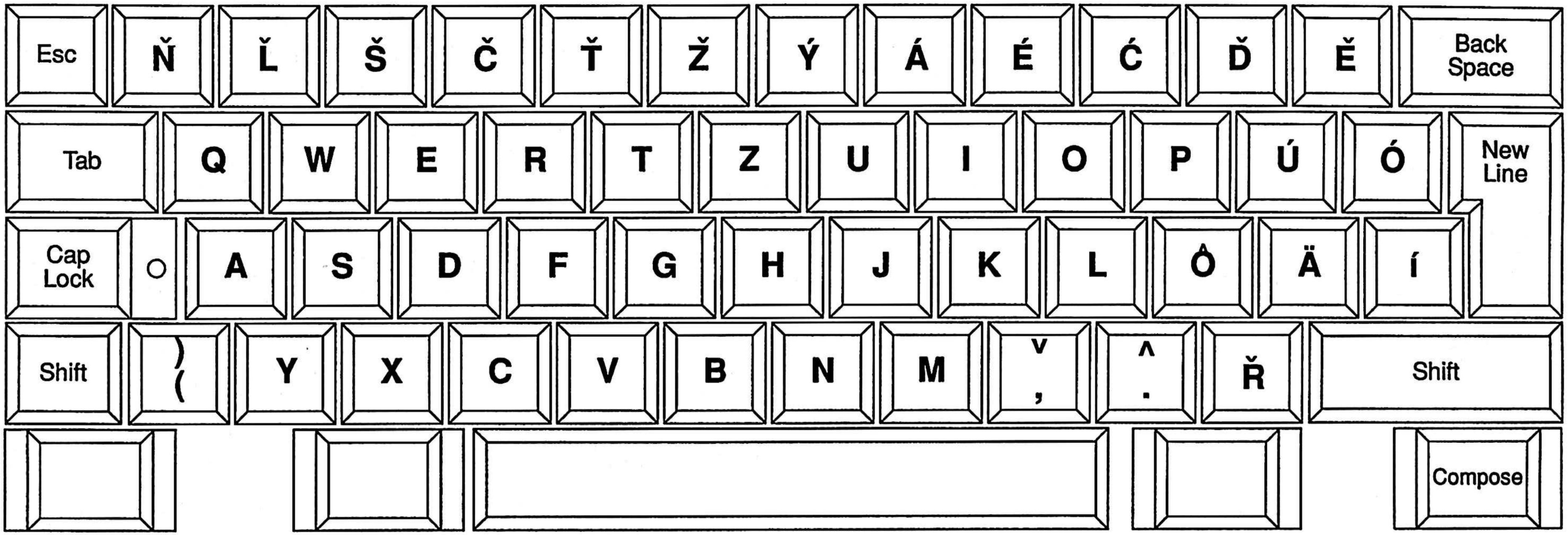
Alternate Character Keys

Slovakian 2


Esc
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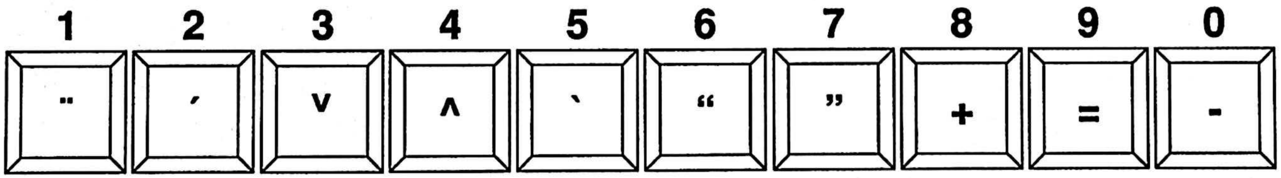
Shift
Compose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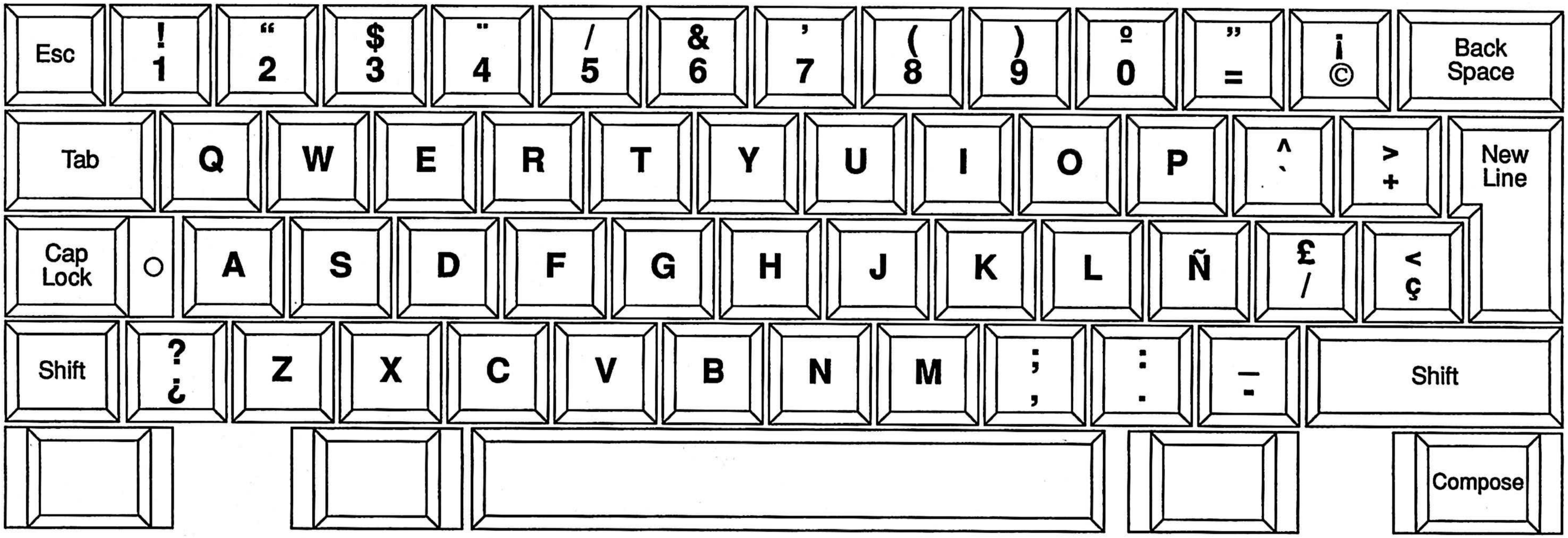
Alternate Character Keys

Spanish/Brazilian


Esc
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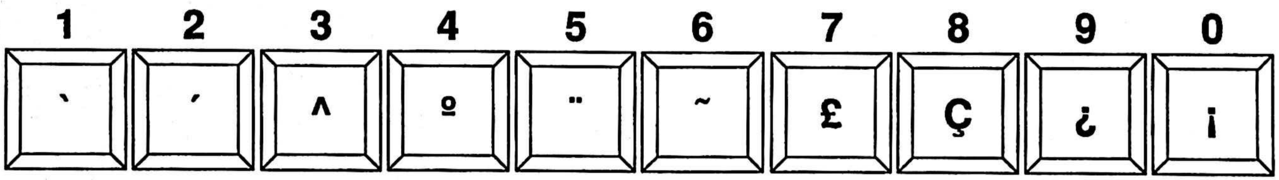
Compose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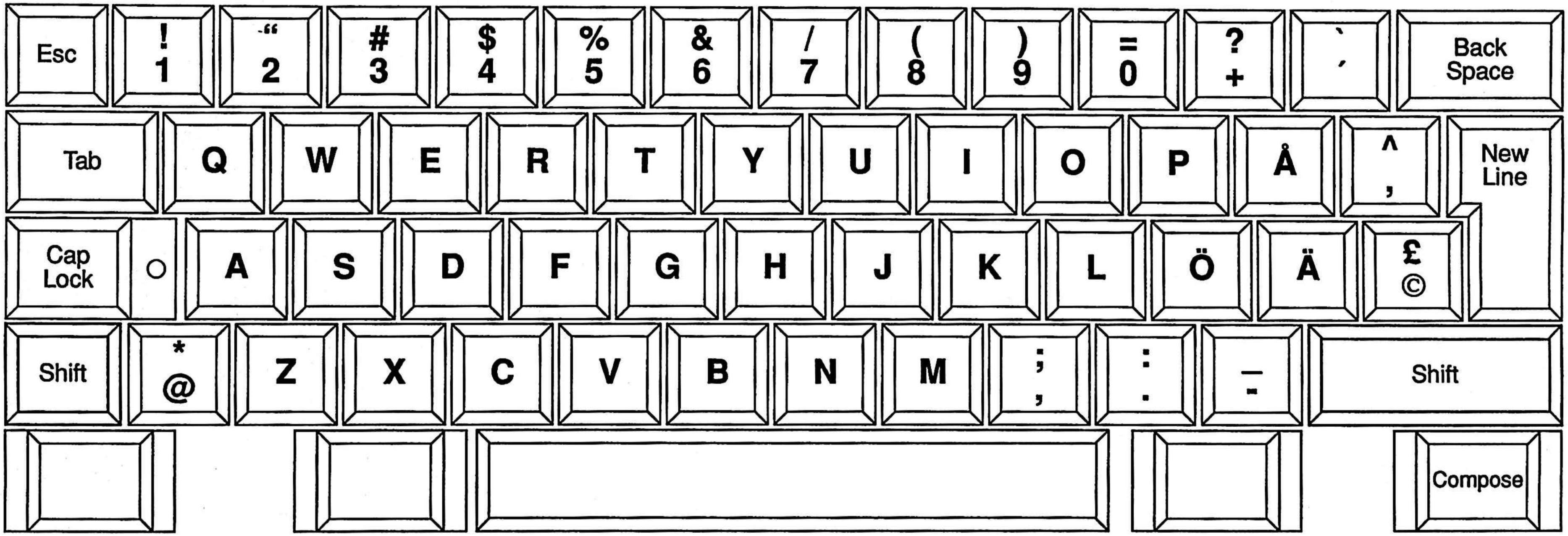
Alternate Character Keys

Swedish/Finnish


Esc
! 1
" 2
# 3
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% 5
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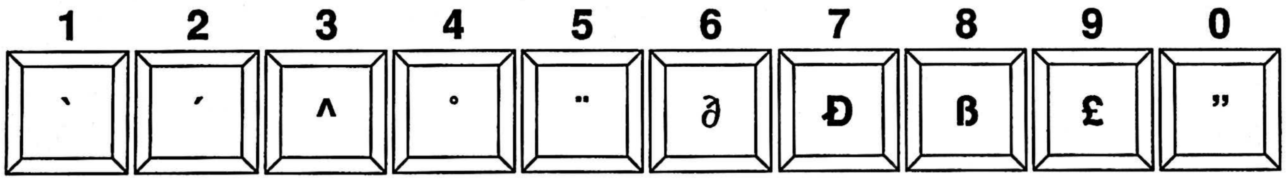
Shift
Compose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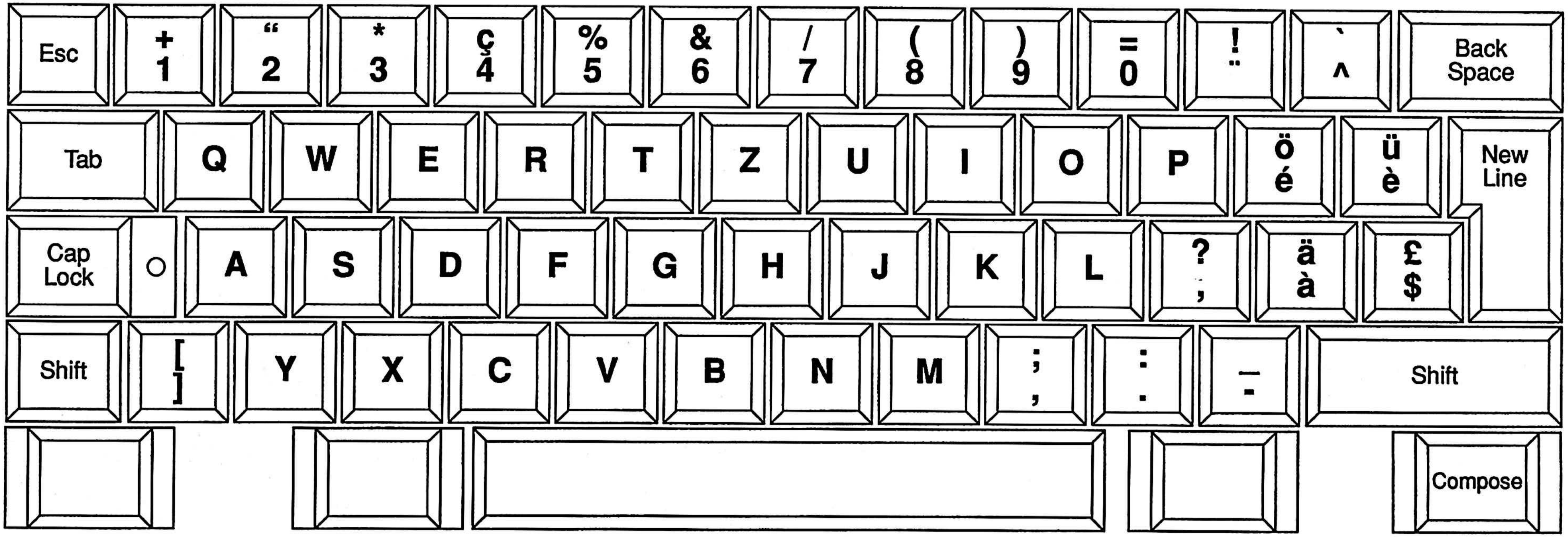
Alternate Character Keys

Swiss French


Esc
+ 1
“ 2
* 3
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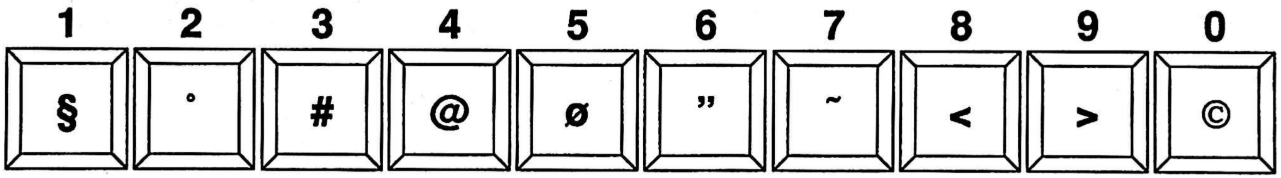
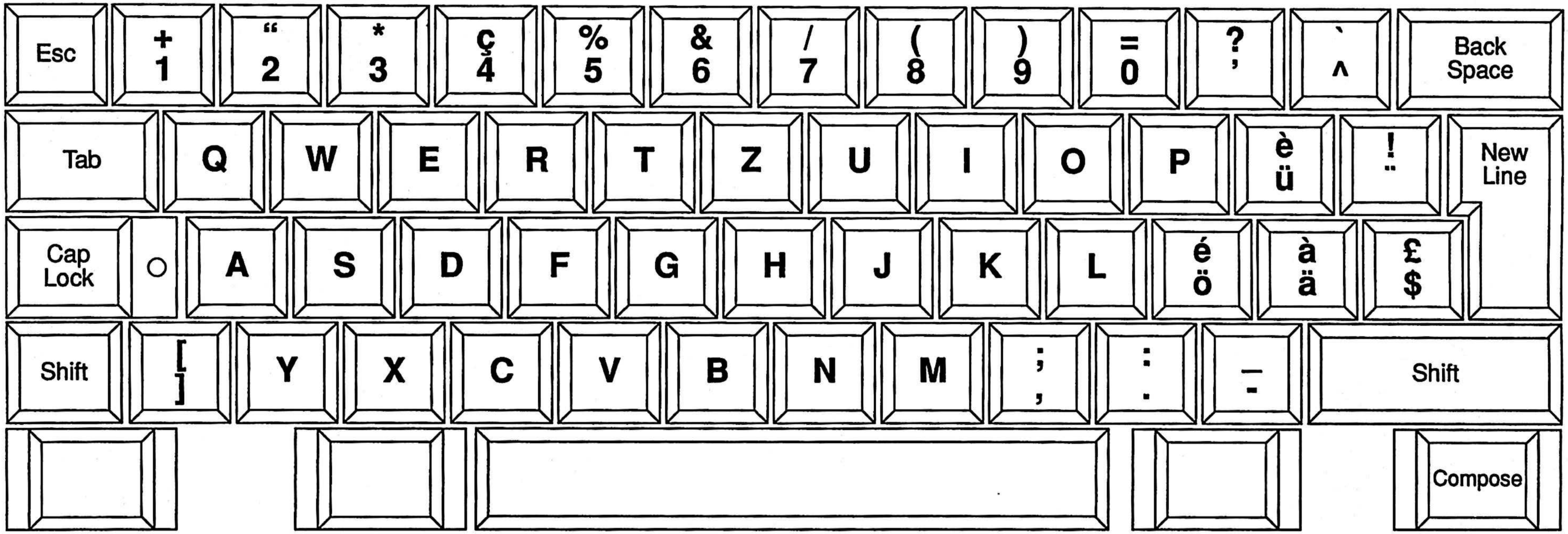
Shift
Compose

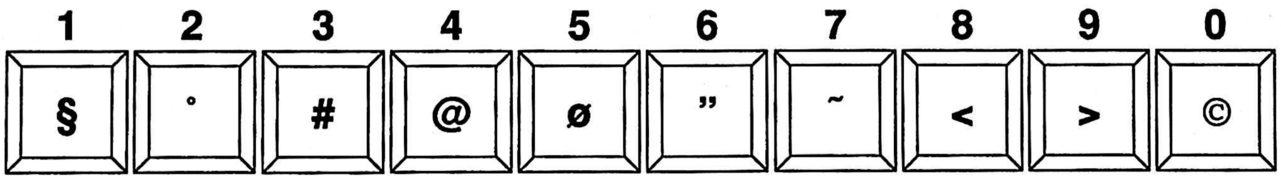

1
2
3
4
5
6
7
8
9
0
§
°
#
@
ø
”
~
<
>
©

Alternate Character Keys

Swiss German



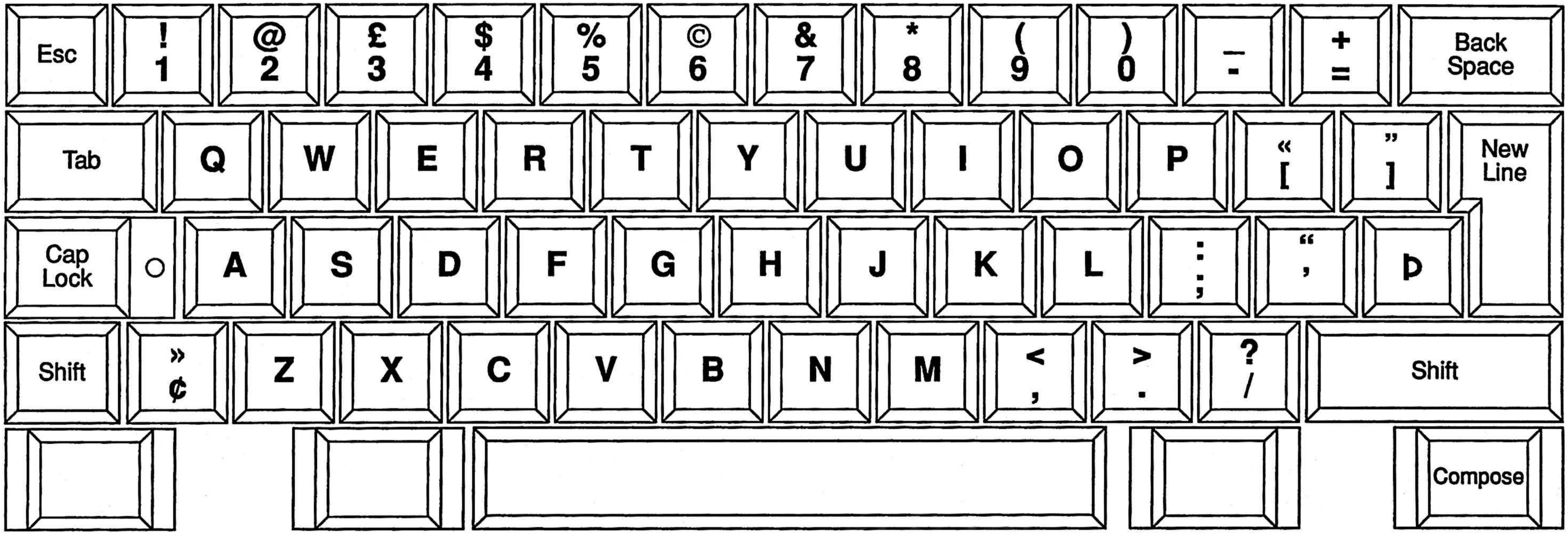
Esc
+ 1
“ 2
* 3
ç 4
% 5
& 6
/ 7
(8
) 9
= 0
? '
` ^
Back Space
Tab
Q
W
E
R
T
Z
U
I
O
P
è ü
! ¨
New Line
Cap Lock
○
A
S
D
F
G
H
J
K
L
é ö
à ä
£ $
Shift
[ ]
Y
X
C
V
B
N
M
; ,
: .
_ -
Shift
Compose

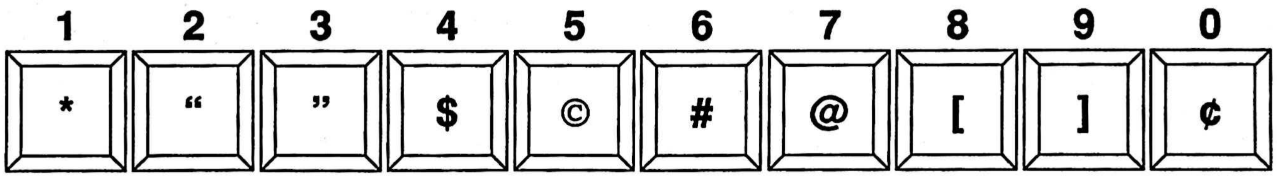


1
2
3
4
5
6
7
8
9
0
§
°
#
@
ø
”
~
<
>
©

Alternate Character Keys

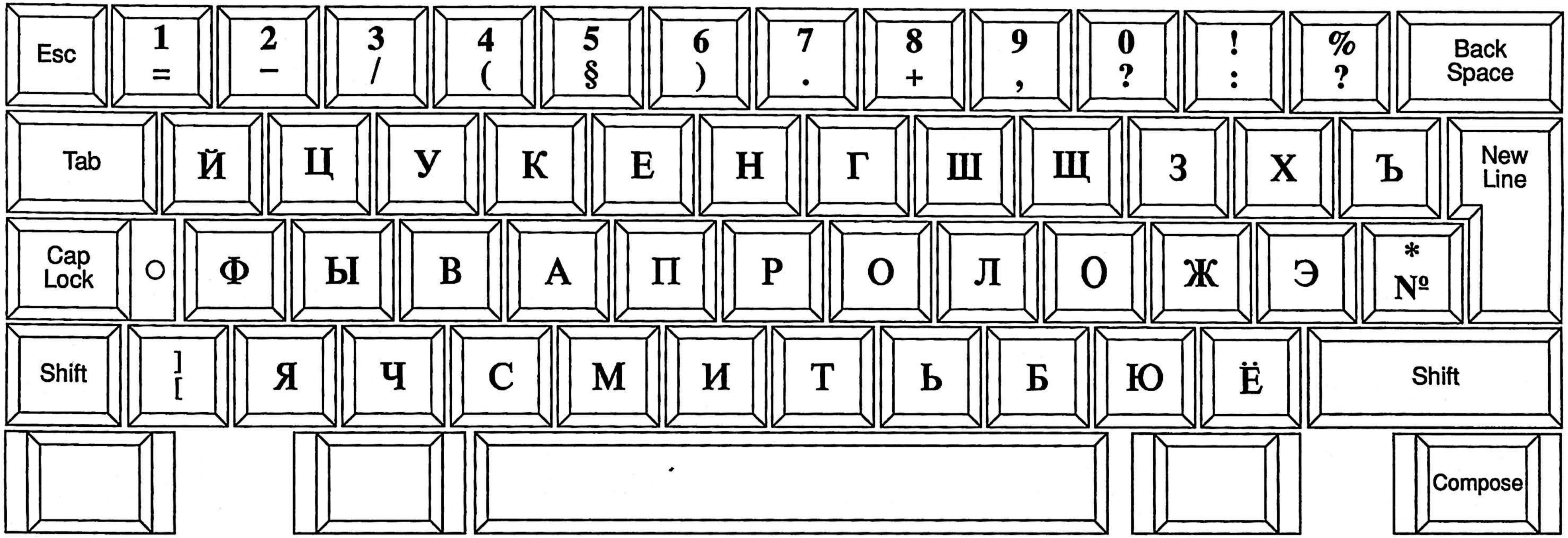
United Kingdom


Esc
! 1
@ 2
£ 3
$ 4
% 5
© 6
& 7
* 8
(9
) 0
_ -
+ =
Back Space
Tab
Q
W
E
R
T
Y
U
I
O
P
« [
"]
New Line
Cap Lock
○
A
S
D
F
G
H
J
K
L
: ;
" ,
Þ
Shift
» ¢
Z
X
C
V
B
N
M
< ,
> .
? /
Shift
Compose


1
2
3
4
5
6
7
8
9
0
*
"
"
$
©
#
@
[
]
¢

Alternate Character Keys

Cyrillic
(optional)


Esc
1 =
2 –
3 /
4 (
5 §
6)
7 .
8 +
9 ,
0 ?
! :
% ?
Back Space
Tab
Й
Ц
У
К
Е
Н
Г
Ш
Щ
З
Х
Ъ
New Line
Cap Lock
○
Ф
Ы
В
А
П
Р
О
Л
О
Ж
Э
* №
Shift
] [
Я
Ч
С
М
И
Т
Ь
Б
Ю
Ё
Shift
Compose

Appendix B: KEYBOARD CODES

To control the 20-K remotely with an external computer, use **Confg P**. To configure a serial port for communications with your computer, set the port `Usage` to `HOST`. Configure the protocol parity, baud rate, etc., as appropriate for your computer, and connect your computer to the port. Be sure to use the proper cable.

Transmit the following 8-bit keystroke codes from your computer to the 20-K. The 20-K responds as if you had typed the keystrokes. Since some systems have difficulty sending 8-bit codes, the code following a SOH (binary 1) is interpreted as if it had bit 8 set. For example, to transmit a **Read,** send either 8F, or 01 followed by 0F.

00		01	SOH	02		03	
04		05		06		07	
08	LEFT	09	TAB	0A	DOWN	0B	UP
0C	RIGHT	0D	NEW LINE	0E		0F	
10		11	XON/DC1	12	DC2	13	XOFF DC3
14	DC4	15	NAK	16	SYN	17	TB
18		19		1A		1B	ESC
1C		1D		1E	HOME	1F	CLR/EOL
20	SPACE	21	!	22	"	23	#
24	$	25	%	26	&	27	'
28	(	29	)	2A	*	2B	+
2C	,	2D	-	2E	.	2F	/
30	0	31	1	32	2	33	3
34	4	35	5	36	6	37	7
38	8	39	9	3A	:	3B	;
3C	<	3D	=	3E	>	3F	?
40	@	41	A	42	B	43	C
44	D	45	E	46	F	47	G
48	H	49	I	4A	J	4B	K
4C	L	4D	M	4E	N	4F	O
50	P	51	Q	52	R	53	S
54	T	55	U	56	V	57	W
58	X	59	Y	5A	Z	5B	[
5C	\	5D	]	5E	^	5F	_

60	61 a	62 b	63 c
64 d	65 e	66 f	67 g
68 h	69 i	6A j	6B k
6C l	6D m	6E n	6F o

70 p	71 q	72 r	73 s
74 t	75 u	76 v	77 w
78 x	79 y	7A z	7B {
7C |	7D }	7E ~	7F BACKSPACE (RUB)

80 COMPOSE	81 HELP	82 SEL DISP	83 PAL
84 FONT	85 DISK UTIL	86 CONFG	87 DIR
88 MISC	89 BKGD	8A TEXT	8B CENTR
8C REC	8D SEQ PLAY	8E EFFCT	8F READ

90 CANCEL	91 END OF MSG	92 SELECT FGD	93 SELECT BGD
94 MSG NAME	95 READ NEXT	96 SEQ NEXT	97 SEQ PREV
98 K EDIT	99 LEARN	9A	9B
9C	9D SEQ PLAY	9E READ FGD	9F READ BGD

A0 MOVE CHAR	A1	A2 KERN ROW	A3
A4 MOVE ROW	A5	A6 INSERT	A7 INSERT ROW
A8 ERASE TEXT	A9 ERASE BGD	AA DELETE	AB DELETE ROW
AC PAGE DOWN	AD PAGE UP	AE NEXT WORD	AF END INPUT
B0 CHANNEL A	B1 CHANNEL B	B2 SWAP	B3 WEAVE
B4 FONT DISPLAY	B5 FONT DRIVE	B6 MSG DRIVE	B7 DIRECTORY
B8 MAG +	B9 MAG -	BA DELETE MSG	BB
BC	BD	BE	BF

C0 CHAR UP	C1 CHAR DOWN	C2 CHAR LEFT	C3 CHAR/RIGHT
C4 ROW UP	C5 ROW DOWN	C6 ROW LEFT	C7 ROW RIGHT
C8 XCHG UP	C9 XCHG DOWN	CA KERN LEFT	CB KERN RGHT
CC	CD	CE	CF

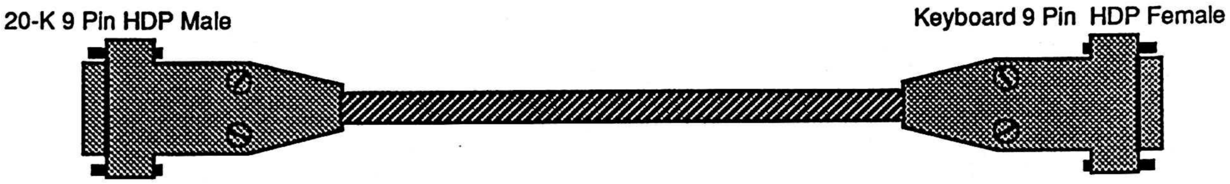
D0 PAINT	D1 CHAN-CONTRL	D2 DO	D3 CGEN
D4 3-D/ELECTKEY	D5	D6	D7
D8	D9	DA	DB
DC	DD EXTASC	DE	DF FSCHK_HELP

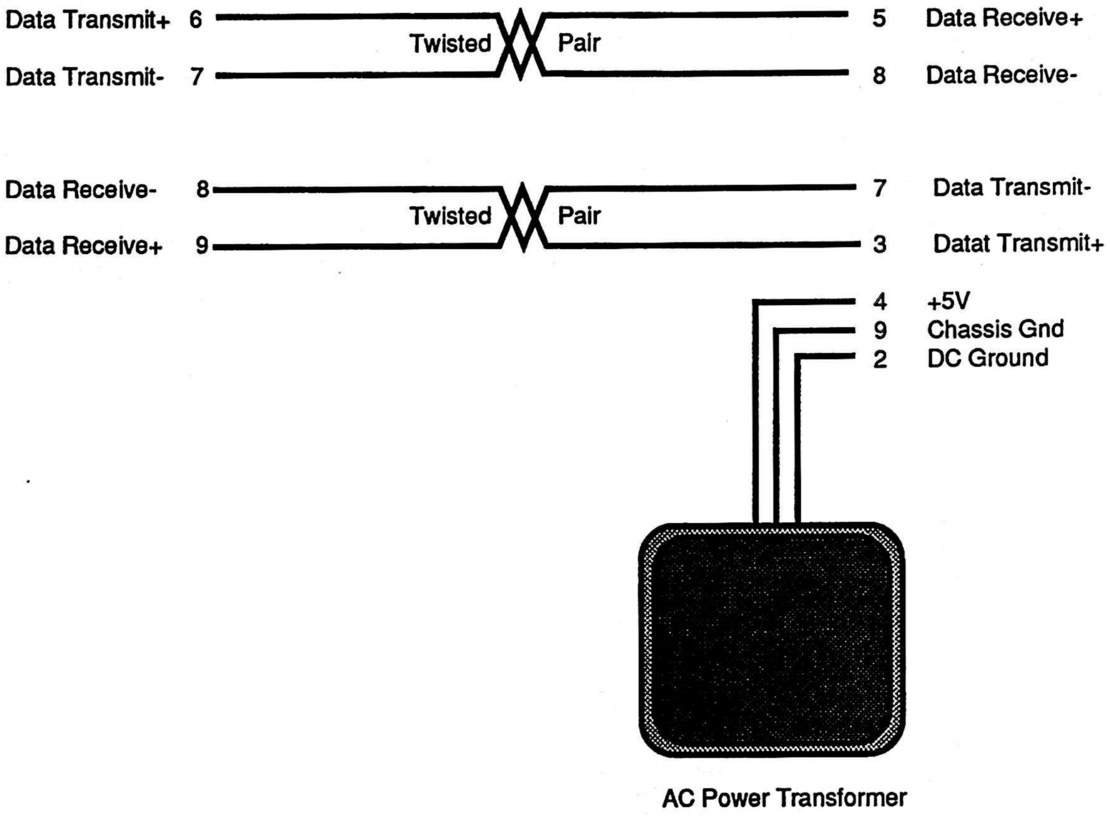
E0 SHIFT	E1 SEL1	E2 SEL2	E3 SEL3
E4 SEL4	E5 SEL5	E6 SEL6	E7 SEL7
E8 SEL8	E9 CAP LOCK	EA ALT	EB ENTER
EC NEXT	ED PREV	EE CONTROL	EF

F0 (AUX) 0	F1 (AUX) 1	F2 (AUX) 2	F3 (AUX) 3
F4 (AUX) 4	F5 (AUX) 5	F6 (AUX) 6	F7 (AUX) 7
F8 (AUX) 8	F9 (AUX) 9	FA (AUX) ??	FB (AUX) NEXT
FC (AUX) PREV	FD GRAPH	FE (AUX) +/-	FF UNUSED

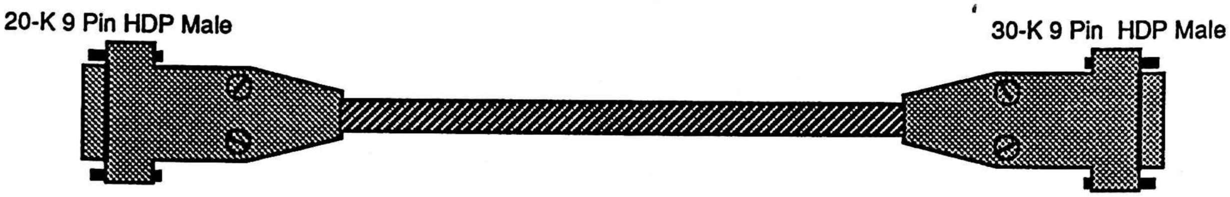
Appendix C: CABLING DIAGRAMS

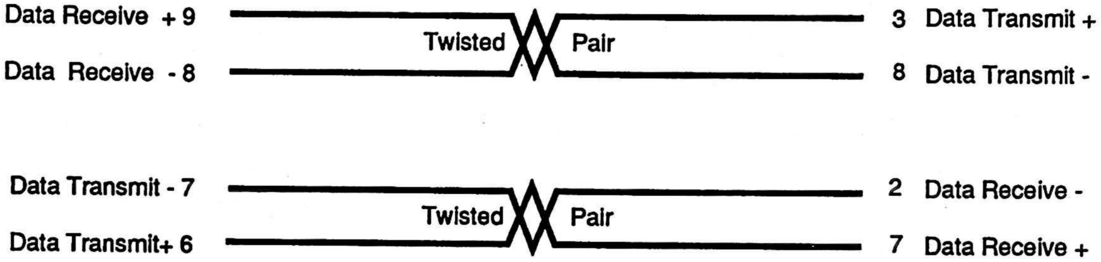
20-K Keyboard Cable


20-K 9 Pin HDP Male
Keyboard 9 Pin HDP Female

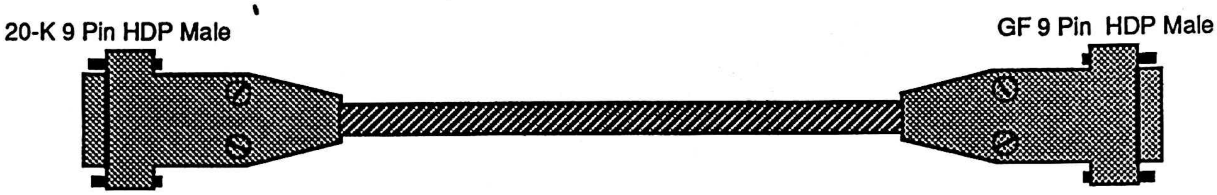

Data Transmit+ 6
Data Transmit- 7
Twisted
Pair
5 Data Receive+
8 Data Receive-
Data Receive- 8
Data Receive+ 9
Twisted
Pair
7 Data Transmit-
3 Datat Transmit+
4 +5V
9 Chassis Gnd
2 DC Ground
AC Power Transformer

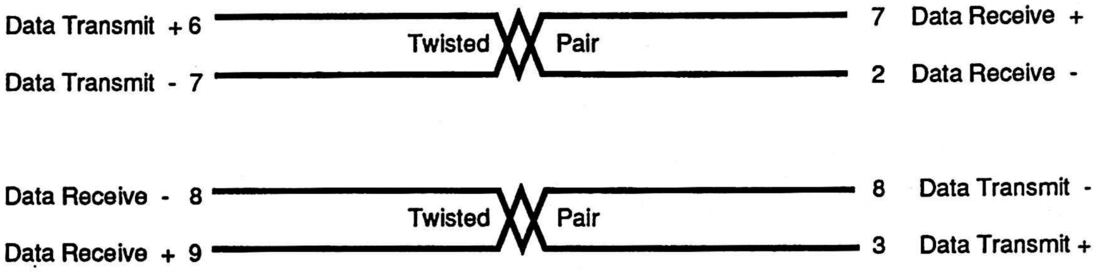
20-K to 30-K RS422 Cable


20-K 9 Pin HDP Male
30-K 9 Pin HDP Male

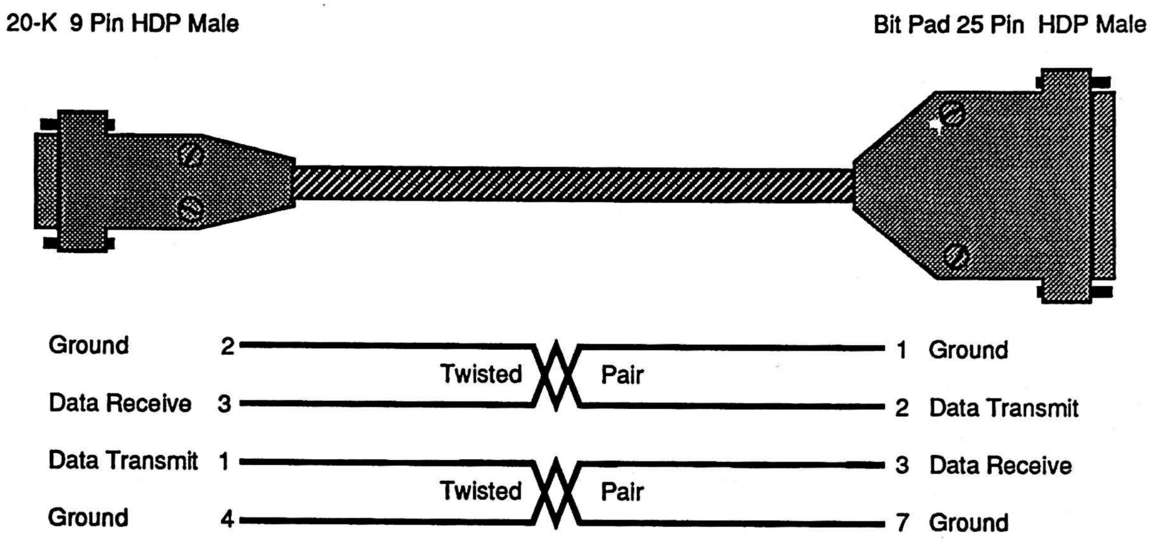

Data Receive + 9
Data Receive - 8
Twisted
Pair
3 Data Transmit +
8 Data Transmit -
Data Transmit - 7
Data Transmit+ 6
Twisted
Pair
2 Data Receive -
7 Data Receive +

20-K to GF RS422 Cable

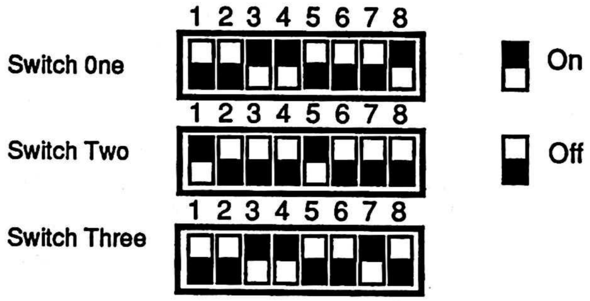

20-K 9 Pin HDP Male
GF 9 Pin HDP Male


Data Transmit + 6
Data Transmit - 7
Twisted
Pair
7 Data Receive +
2 Data Receive -
Data Receive - 8
Data Receive + 9
Twisted
Pair
8 Data Transmit -
3 Data Transmit +

20-K to GTCO Bit Pad RS 232 Cable

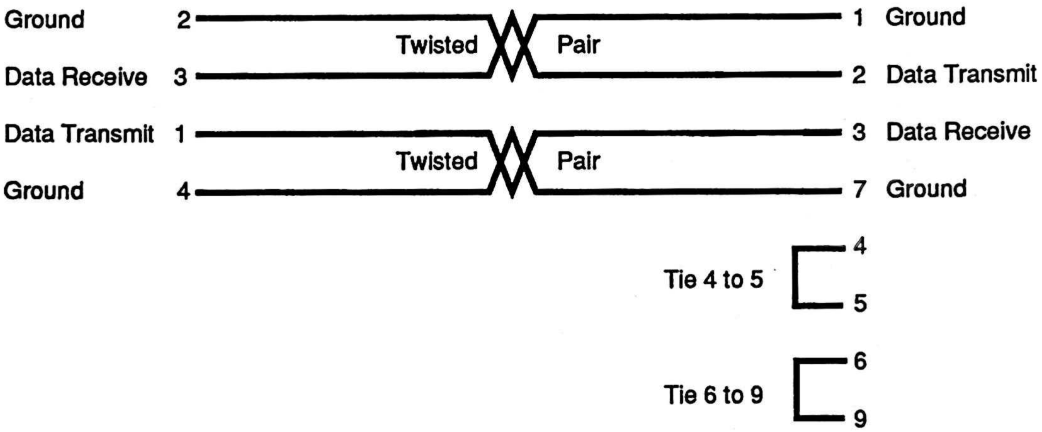

20-K 9 Pin HDP Male
Bit Pad 25 Pin HDP Male
Ground 2
Data Receive 3
Data Transmit 1
Ground 4
Twisted
Pair
Twisted
Pair
1 Ground
2 Data Transmit
3 Data Receive
7 Ground

GTCO Switch Settings

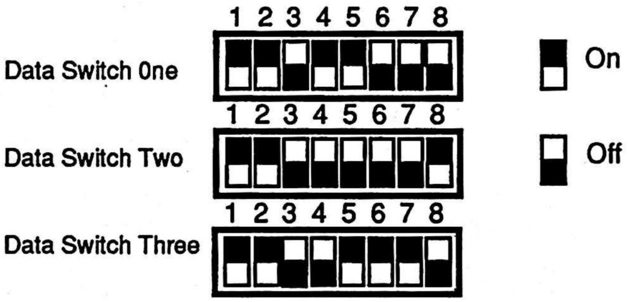

Switch One
1 2 3 4 5 6 7 8
Switch Two
1 2 3 4 5 6 7 8
Switch Three
1 2 3 4 5 6 7 8
On
Off

20-K to Wacom Bit Pad RS 232 Cable

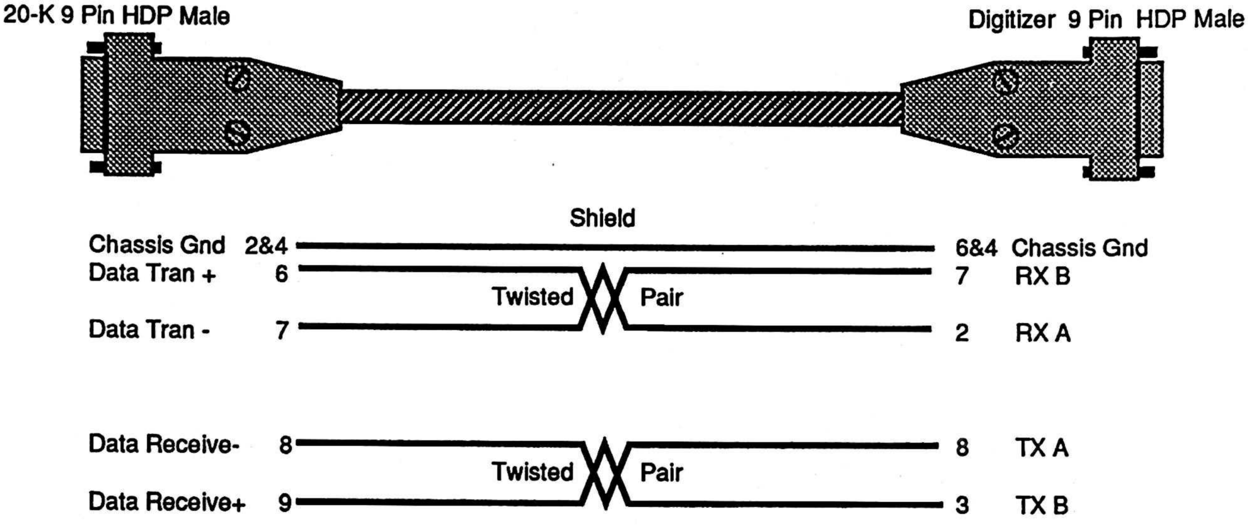
20-K 9 Pin HDP Male
Bit Pad 9 Pin HDP Male


Ground 2
Data Receive 3
Twisted Pair
1 Ground
2 Data Transmit
Data Transmit 1
Ground 4
Twisted Pair
3 Data Receive
7 Ground
Tie 4 to 5
4
5
Tie 6 to 9
6
9

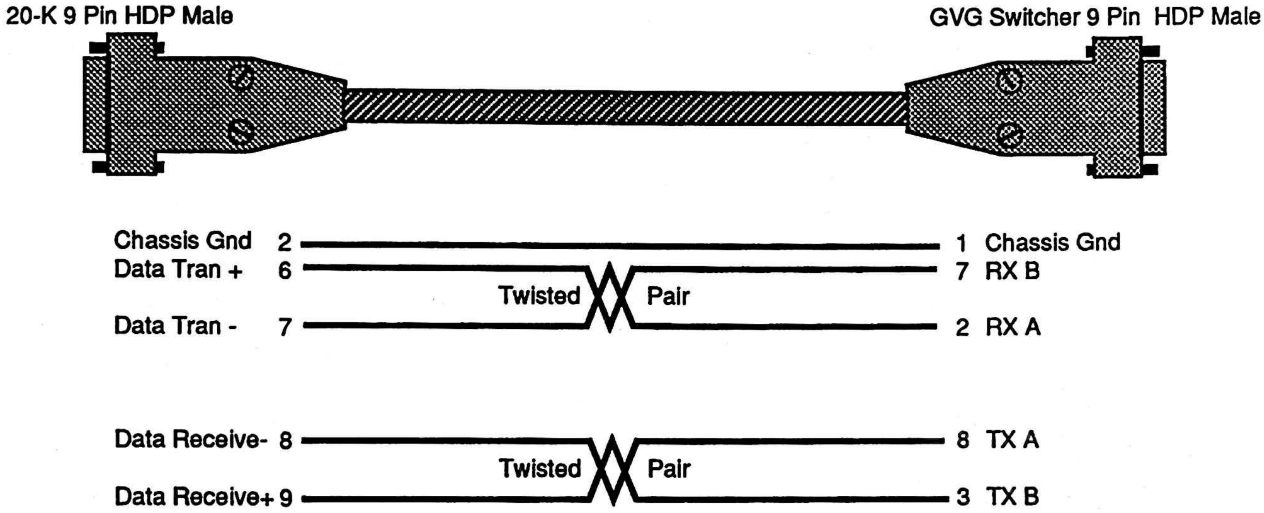
Wacom Switch Settings


1 2 3 4 5 6 7 8
Data Switch One
1 2 3 4 5 6 7 8
Data Switch Two
1 2 3 4 5 6 7 8
Data Switch Three
On
Off

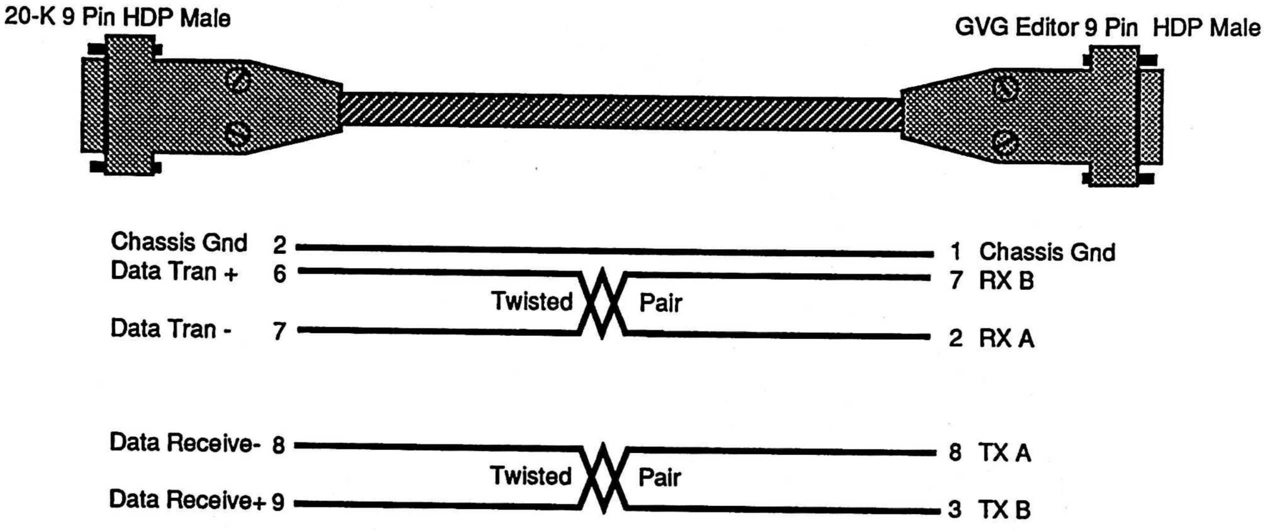
20-K to Digitizer Cable


20-K 9 Pin HDP Male
Digitizer 9 Pin HDP Male
Shield
Chassis Gnd 2&4
6&4 Chassis Gnd
Data Tran + 6
7 RX B
Twisted
Pair
Data Tran - 7
2 RX A
Data Receive- 8
8 TX A
Twisted
Pair
Data Receive+ 9
3 TX B

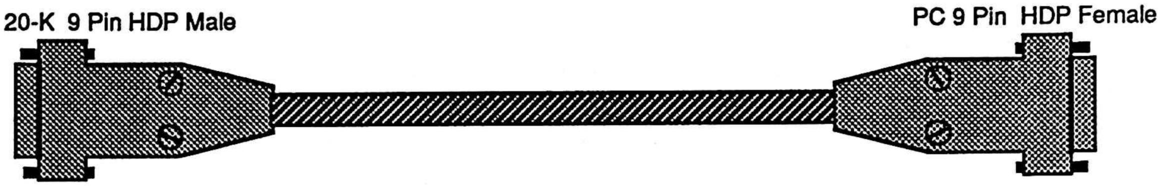
20-K to GVG 200-300 RS 422 Cable

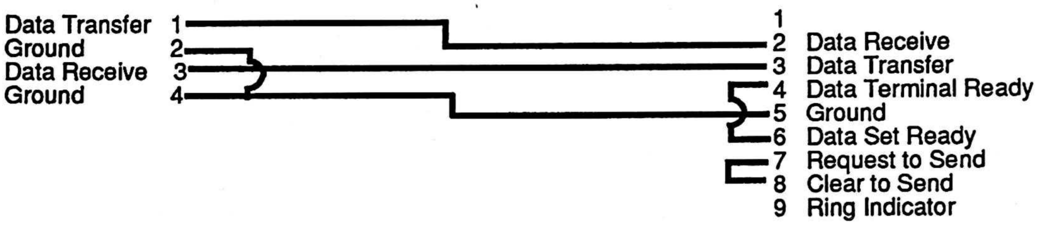

20-K 9 Pin HDP Male
GVG Switcher 9 Pin HDP Male
Chassis Gnd 2
1 Chassis Gnd
Data Tran + 6
7 RX B
Twisted
Pair
Data Tran - 7
2 RX A
Data Receive- 8
8 TX A
Twisted
Pair
Data Receive+ 9
3 TX B

20-K to GVG Editor RS422 Cable


20-K 9 Pin HDP Male
GVG Editor 9 Pin HDP Male
Chassis Gnd 2
1 Chassis Gnd
Data Tran + 6
7 RX B
Twisted
Pair
Data Tran - 7
2 RX A
Data Receive- 8
8 TX A
Twisted
Pair
Data Receive+ 9
3 TX B

20-K to IBM RS-232 Cable

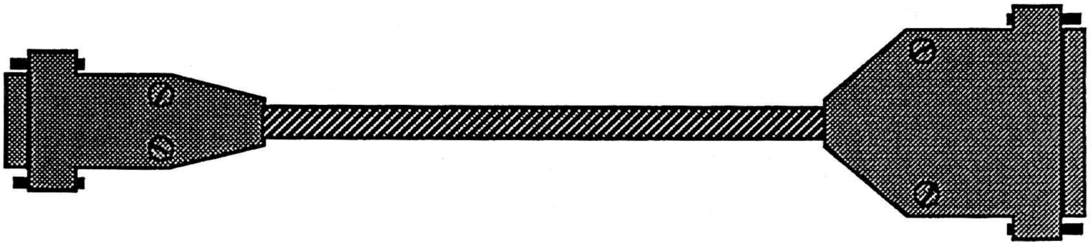

20-K 9 Pin HDP Male
PC 9 Pin HDP Female

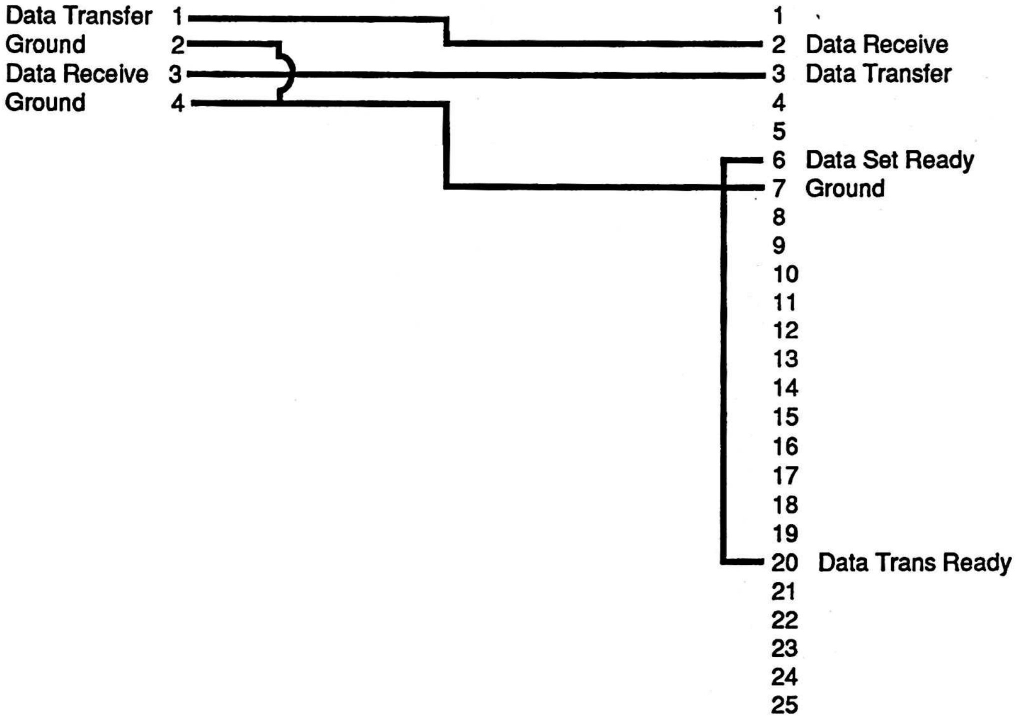

Data Transfer 1
Ground 2
Data Receive 3
Ground 4
1
2 Data Receive
3 Data Transfer
4 Data Terminal Ready
5 Ground
6 Data Set Ready
7 Request to Send
8 Clear to Send
9 Ring Indicator

20-K to Modem RS 232 Cable

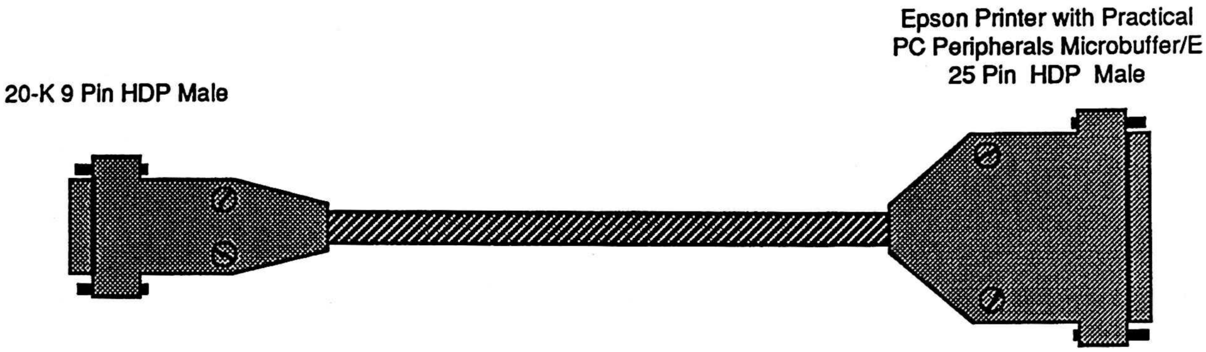
20-K 9 Pin HDP Male

Modem 25 Pin HDP Female




Data Transfer 1
Ground 2
Data Receive 3
Ground 4
1
2 Data Receive
3 Data Transfer
4
5
6 Data Set Ready
7 Ground
8
9
10
11
12
13
14
15
16
17
18
19
20 Data Trans Ready
21
22
23
24
25

20-K to Epson Printer RS 232 Cable


20-K 9 Pin HDP Male
Epson Printer with Practical
PC Peripherals Microbuffer/E
25 Pin HDP Male

Ground	2 & 4	7	Ground
Data Transmit	1	2	Data Receive
Data Receive	3	3	Data Transfer

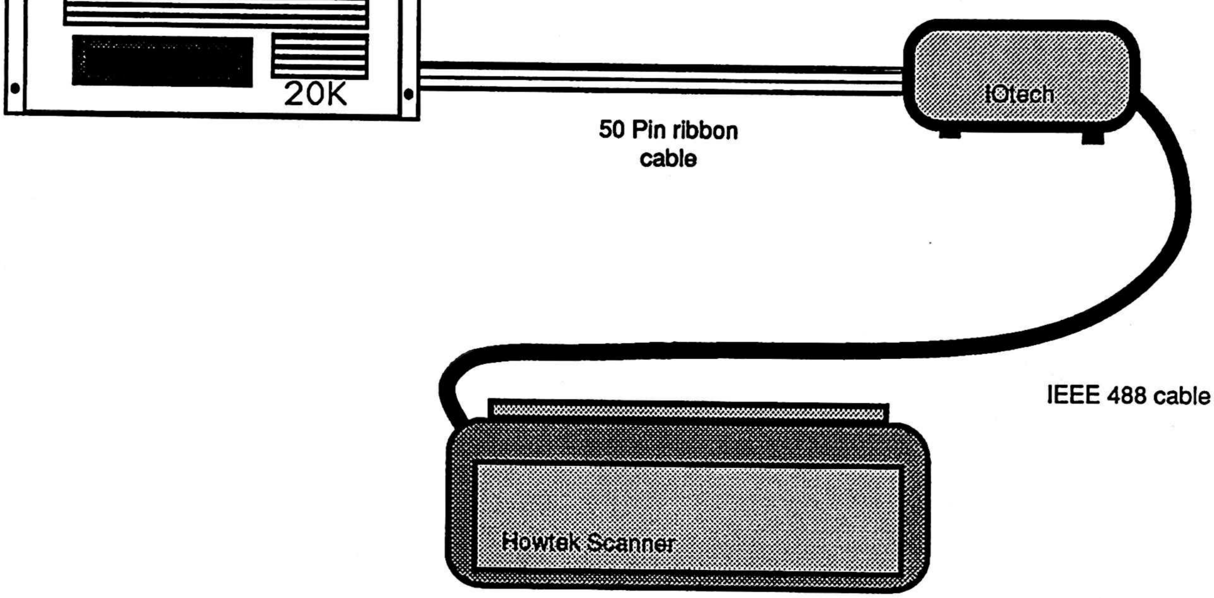
This illustration applies to the following printers:

RX 80 Epson , MX 80 Epson

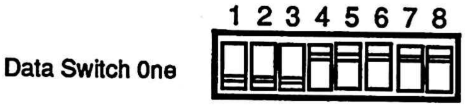
For other models, check your printer manual or call Epson at (818) 991-8200

20-K to Howtek Scanner

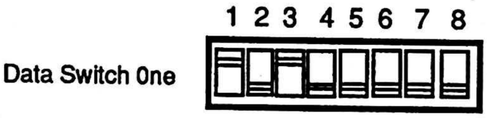
20-K units with a Serial no. less than 2032 require a SCSI Conditioner, model no. K-CSC. Contact Dubner Computer Systems.


20K
IOtech
50 Pin ribbon cable
IEEE 488 cable
Howtek Scanner

Howtek Switch Settings

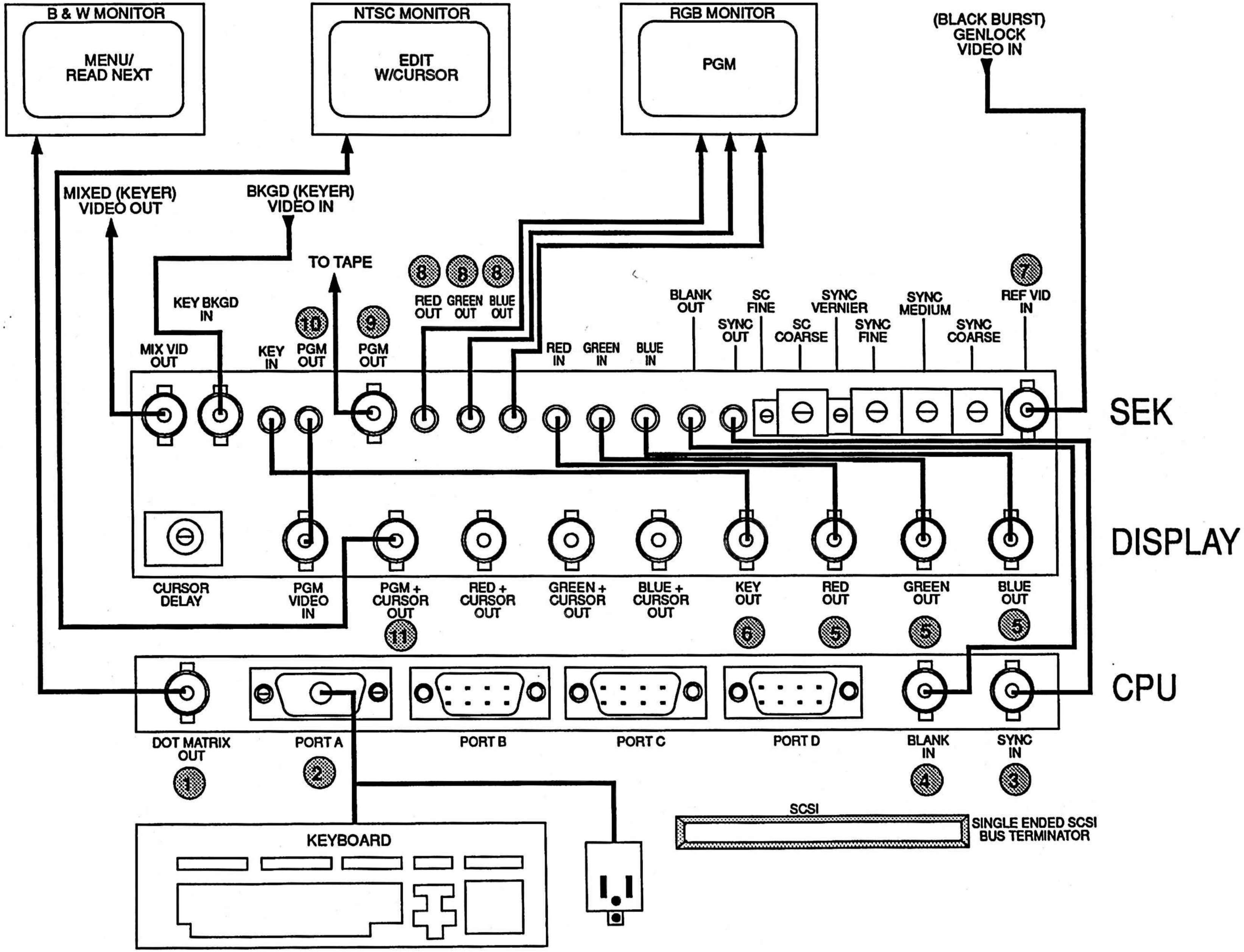

1 2 3 4 5 6 7 8
Data Switch One

IOtech Switch Settings


1 2 3 4 5 6 7 8
Data Switch One

Appendix D: CABLING GUIDE

20-K Cabling Diagram


B & W MONITOR
MENU/ READ NEXT
NTSC MONITOR
EDIT W/CURSOR
RGB MONITOR
PGM
(BLACK BURST) GENLOCK VIDEO IN
MIXED (KEYER) VIDEO OUT
BKGD (KEYER) VIDEO IN
TO TAPE
8
8
8
RED OUT
GREEN OUT
BLUE OUT
KEY BKGD IN
10
9
MIX VID OUT
KEY IN
PGM OUT
PGM OUT
RED IN
GREEN IN
BLUE IN
BLANK OUT
SYNC OUT
SC FINE
SC COARSE
SYNC VERNIER
SYNC FINE
SYNC MEDIUM
SYNC COARSE
7
REF VID IN
SEK
DISPLAY
CURSOR DELAY
PGM VIDEO IN
PGM + CURSOR OUT
11
RED + CURSOR OUT
GREEN + CURSOR OUT
BLUE + CURSOR OUT
KEY OUT
6
RED OUT
5
GREEN OUT
5
BLUE OUT
5
CPU
DOT MATRIX OUT
1
PORT A
2
PORT B
PORT C
PORT D
BLANK IN
4
SYNC IN
3
SCSI
SINGLE ENDED SCSI BUS TERMINATOR
KEYBOARD

We ship the 20-K with seven 8" coaxial cables and three 6' cables. Follow these steps when hooking up the 20-K:

1. Dot Matrix Out (CPU) -> Video In (status monitor). Cable not supplied.
2. Ports (CPU) -> Keyboard. One keyboard and an associated cable is shipped with the system. The keyboard supplied with the 10-K should be plugged into serial port A.
3. Sync In (CPU) -> Sync Out (SEK). Use supplied 8" cable.
4. Blank In (CPU) -> Blank Out (SEK). Use supplied 8" cable.
5. RGB Out (Display) -> RGB In (SEK). Use three of the supplied 8" cables.
6. Key Out (Display) -> Key In (SEK). Use supplied 8" cable.
7. Genlock or Black Burst -> Ref Vid In (SEK). Cable not supplied.
8. RGB Out (SEK) -> RGB monitor. Use the supplied three 6' cables.
9. PGM Out (larger one–SEK) -> Tape, NTSC monitor, switcher.
10. PGM Out (smaller one–SEK) -> PGM Video In (Display). Use the supplied 8" cable.
11. PGM + Cursor Out (Display) -> NTSC monitor. Use your own cable. This output includes cursor and safe title lines.

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